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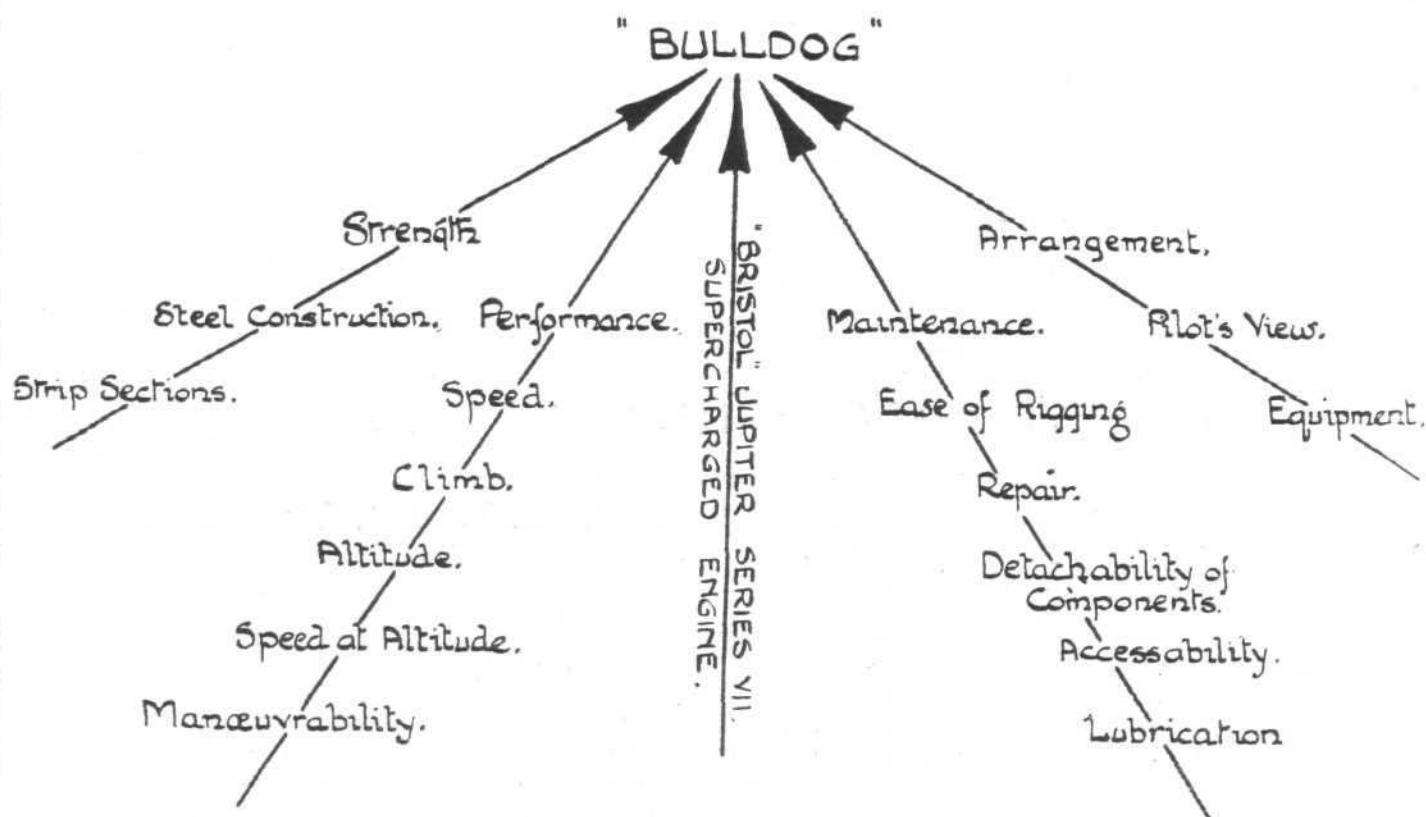
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DIARY OF CURRENT AND FORTHCOMING EVENTS

Club Secretaries and others desirous of announcing the dates of important fixtures are invited to send particulars for inclusion in this list—

1929.	
May 9	Lecture, "Civil Aviation Prospects in East Africa," by F. Symms, before R.Ae.S. and Inst.Ae.E.
May 20	Norfolk Air Display.
May 20	Northampton Air Pageant.
May 23	Lecture, "Lubrication of Aircraft Engines," by F. A. Foord, before R.Ae.S. and Inst.Ae.E.
May 23-	Royal Tournament, Olympia.
June 8	
June 19-22	F.I.A. Conference, Copenhagen.
June 27-30	Rotterdam International Air Meeting.
July 5-6	King's Cup Race.
July 13	R.A.F. Display at Hendon.
July 16-27	7th International Aero Exhibition, Olympia.
July 25	Bleriot Cross-Channel Flight Anniversary Fete, Calais.
July 28	International Flying Meeting, Sweden.
Aug. 1-14	French Light Plane Meeting, Orly.
Aug. 15	International Balloon Race, Poland.
Sept. 6-7	Schneider Trophy Race, Solent.
Sept. 10-20	Aero Club de France Meeting, Le Baule.
Oct. 1	Gordon-Bennett Balloon Race, St. Louis, U.S.A.
Oct. 31	Guggenheim Safe-Aircraft Competition Closes.

EDITORIAL COMMENT



ONE of the most frank, and therefore informative, papers ever read before the Royal Aeronautical Society and Institution of Aeronautical Engineers was that presented by Sqdn.-Ldr. Scott on April 25. The paper, which dealt with the flight to India and back in the Blackburn "Iris," with Sir Philip

Sassoon and Air-Commodore Longmore as passengers, gave a perfectly fair statement of the flight, its difficulties and troubles, and the manner in which the troubles were overcome. The reputation of the two

Flying-Boat Problems

firms concerned is such that it cannot possibly be damaged by a frank admission that troubles were encountered.

On the contrary, from the daily newspapers it was obvious that the flight did not progress as smoothly as might have been hoped for, and in the absence of an authoritative statement rumour can be relied upon not to minimise the character and magnitude of what occurred. Thus, Sqdn.-Ldr. Scott's paper cannot fail to do a great deal of good by placing on record once and for all the facts of the case, for all to read.

And what were the troubles when one comes down to rock bottom? The first alighting caused by engine trouble, that at Henjam, was found to be due to the fracture of the camshaft-drive housing, which had allowed the bevel wheels to come out of mesh. Certainly it was, it might be argued, a breakage that ought not to have occurred, but, after all, it was not a very damning mishap. The particular part of the casing has now been re-designed, and the trouble is not likely ever to arise again. And if one studies Maj. Scott's paper carefully, practically all the subsequent difficulties were to be traced back to this initial cause, makeshift repairs carried out under great difficulties failing to stand up to the work under which the original part had broken down, which, after all, was scarcely surprising.

Apart from forced landings directly traceable to the effects of the initial breakdown, the only other which was due to engines was caused by mud in the petrol filters. The day before the machine had been in a sandstorm which covered everything with a fine dust like a thick fog. Under the circumstances it is

quite explicable that when flying was resumed the next day some of this fine dust should, no matter what care was taken by the crew, find its way into the petrol system.

Thus, in all fairness to the Rolls-Royce "Condor," the only charge that can be laid against it over this flight is that one of its camshaft bevel casings fractured, and as the part has been re-designed, the trouble should not, as we have already said, recur.

As regards the Blackburn "Iris," Maj. Scott had nothing much but praise for its behaviour. The difficulty of taking off in a calm with what was, after all, an overload is one which is likely to be encountered occasionally by almost any flying-boat, and is, as the lecturer quite correctly pointed out, in a considerable measure due to the British policy of seeking after seaworthiness. The sharp V-bottom is admirable for alighting with a minimum of shock, but increases the difficulties of take-off. As in so many other cases in aircraft engineering, one has to try to find a compromise.

Maj. Scott's paper proves to the hilt the wisdom of the Air Ministry in sending the "Iris" to the East with Sir Philip Sassoon. The conditions in and around the Persian Gulf are very different from those encountered in home waters, and the success of Imperial air lines depends very largely upon how well we can design for the particular conditions to be met with in any given locality. The lessons learned from this flight cannot fail to be of the very greatest value, nor to assist the "improvement of the breed."

Finally, Maj. Scott's suggestions for improvements are interesting and worthy of the closest attention, coming as they do from the practical man concerned with the handling of the machine. It is never very easy to ensure close contact between the designer of a machine and the crew who have to handle it after it leaves the constructor's works, and the more that can be done in this direction the better for future development. The suggestion of retaining the sharp bows forward, but slightly reducing the vee towards the step, and the rounding of the keel to reduce the tendency to swing when alighting with

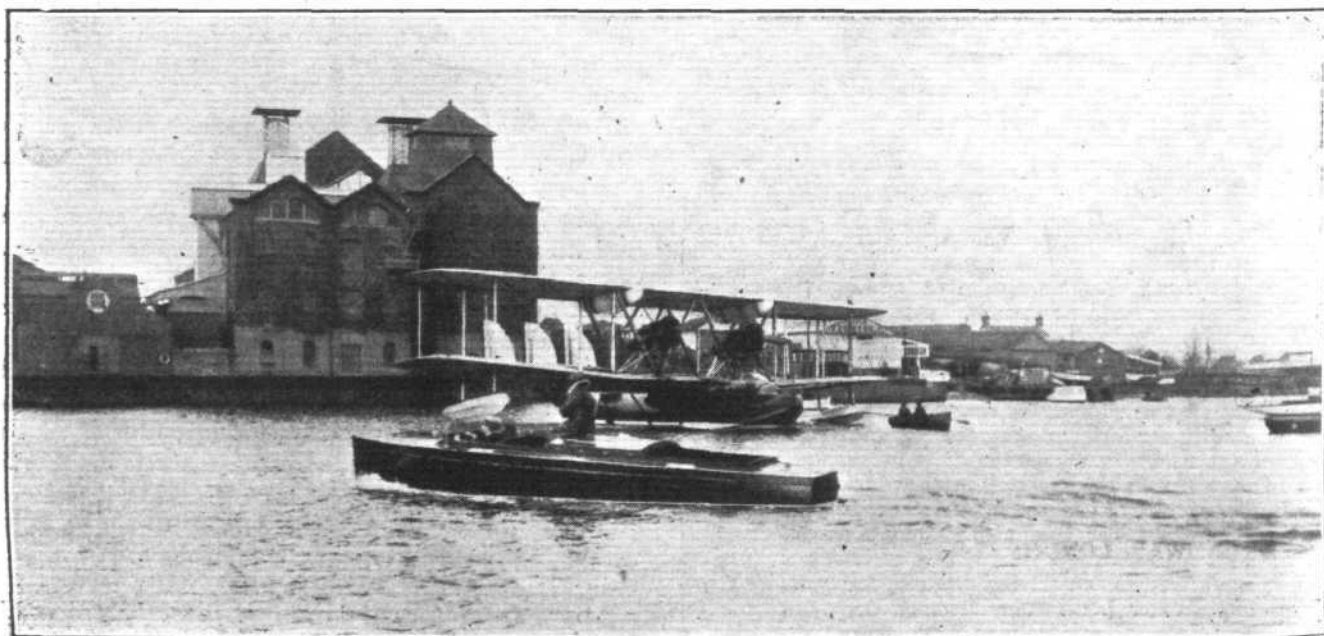
a certain amount of side drift, appears common-sense and sound. There are, however, so many conflicting requirements to be met that it is difficult to express a definite opinion. The suggestion is worth considering, and it is quite certain that if improvements are possible Maj. Rennie will incorporate them in his next boat.

❖ ❖ ❖

It is now quite a long time since FLIGHT began to agitate for the production of light 'planes of lower power and cost than those which have become so popular both in this country and elsewhere. As

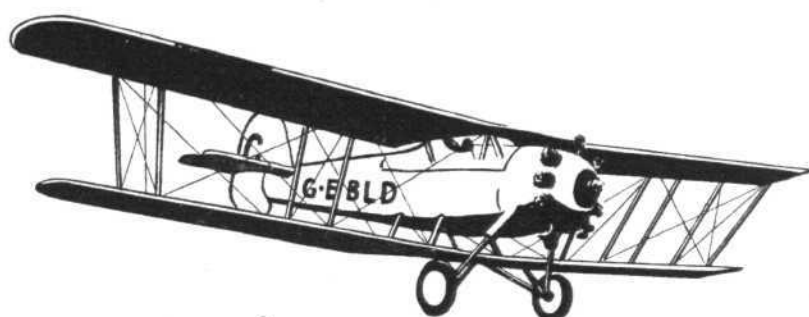
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we have pointed out repeatedly, hitherto there has been no "second choice" for the man anxious to fly, but who has not the means to afford the two-seater selling at £650 or so. Obviously, if he could afford it, he would buy the two-seater, but he would certainly prefer a cheap single-seater, with less performance and possibly less comfort, to not being able to fly at all. That was the line of argument we used originally, and there are now signs that several firms have become convinced that the arguments were sound, and have set to work to produce machines of this class. Photographs appear in this issue of the first of the "motor-cycles of the air" to be completed and flown. This has been built by Col. Henderson and Mr. Rennie, and is fitted with an A.B.C. "Scorpion" engine. As soon as space permits we hope to publish an illustrated description of this machine. In the meantime it is satisfactory to be able to record that the first has made its appearance. We know of several others coming along, and before the end of the year the enthusiast with limited cash at his disposal should have a choice of several types at a price of between £300 and £400. We do not regard the advent of these new firms as a menace to existing concerns building two-seaters. Rather do we look upon them as complementary. The owner of a single-seater will buy a two-seater as soon as he is able to afford it. And in the meantime we are "getting him into the air."



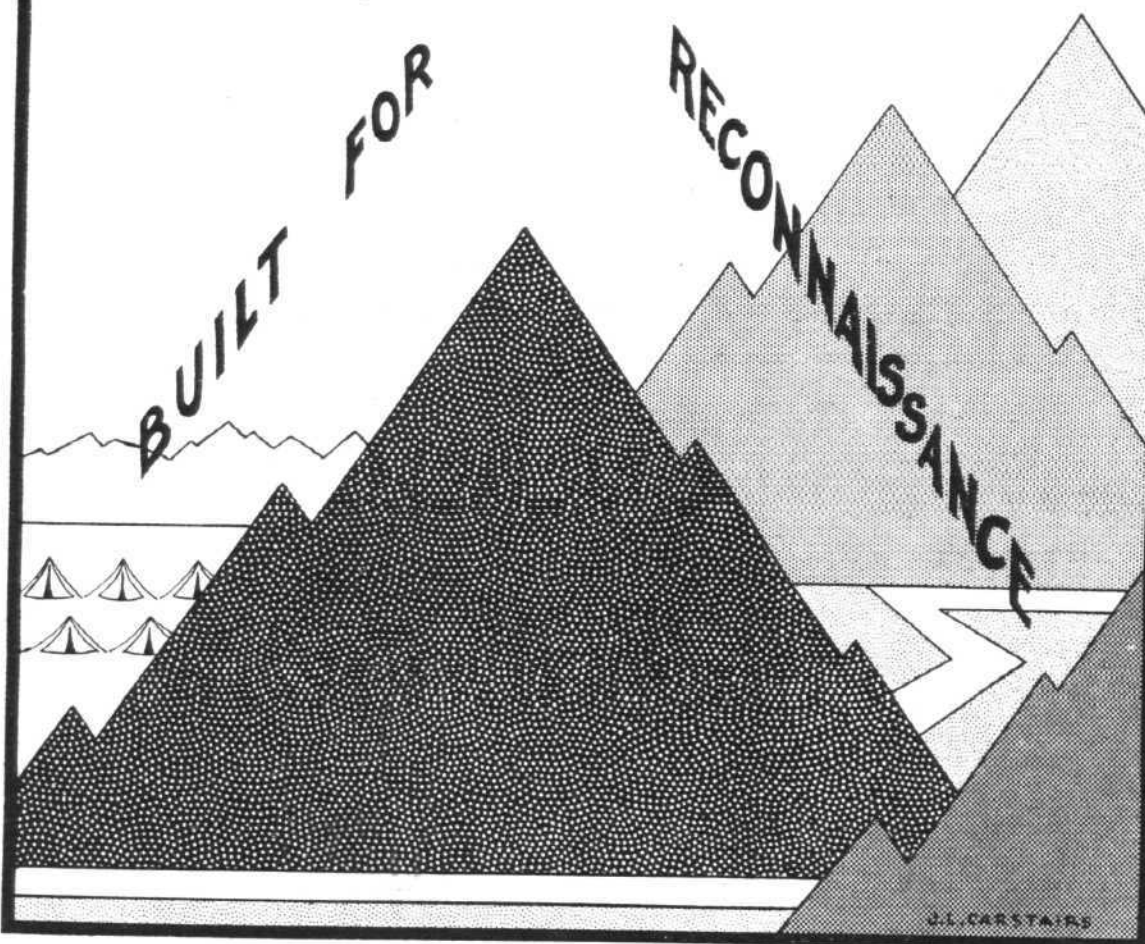
A FLYING-BOAT ON THE NORFOLK BROADS: This photograph shows a Supermarine "Southampton" which recently alighted on Oulton Broad. This is believed to have been the first time in history that a flying-boat has alighted on and started from one of the Broads. In front of the "Southampton" may be seen one of the 24-ft. Brooke 30 m.p.h. "Seacars" ordered for use by the R.A.F. in connection with the Schneider Trophy Contest.

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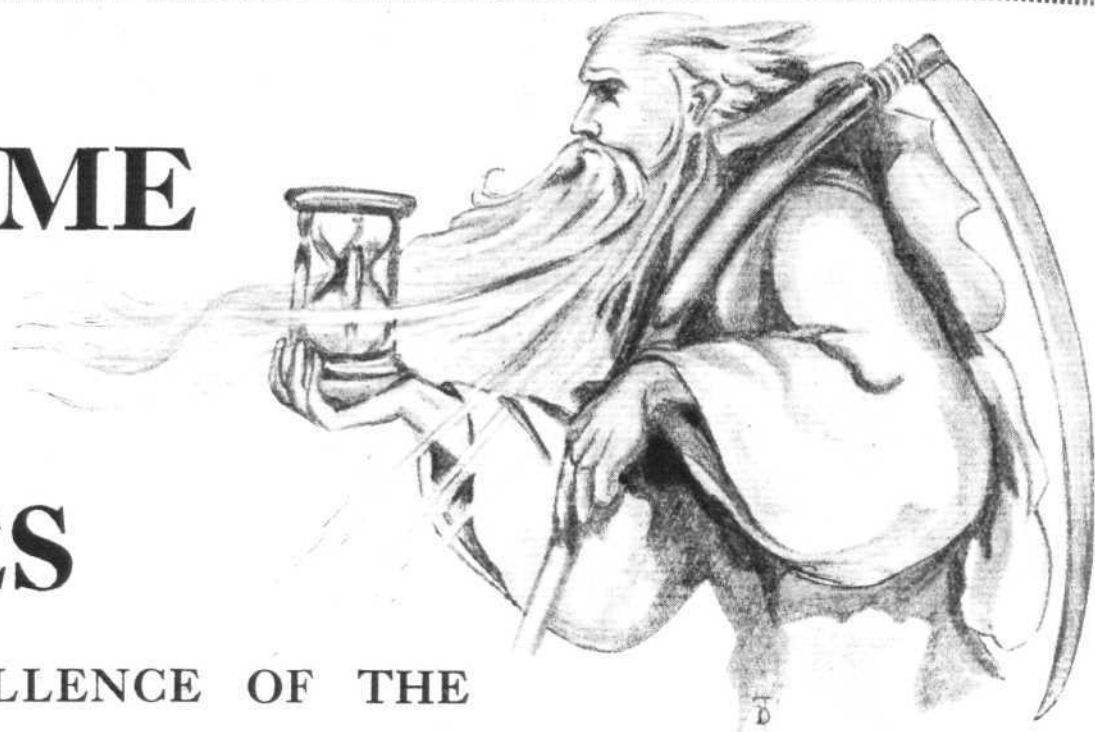
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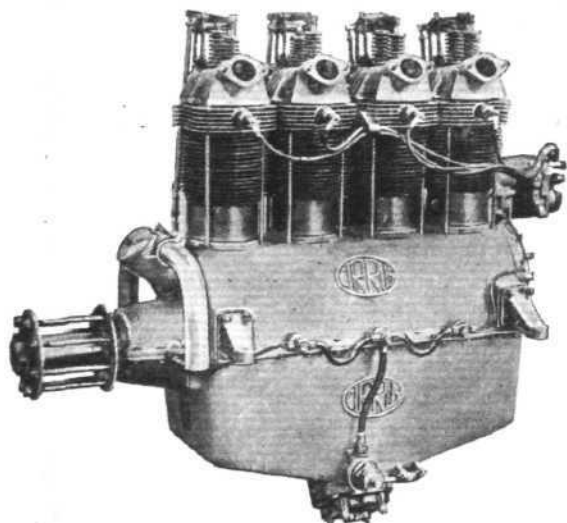
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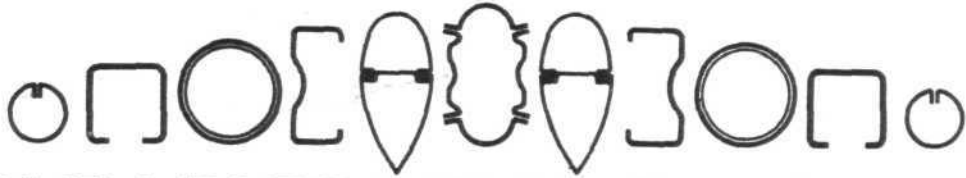
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HANDLEY PAGE METAL CONSTRUCTION

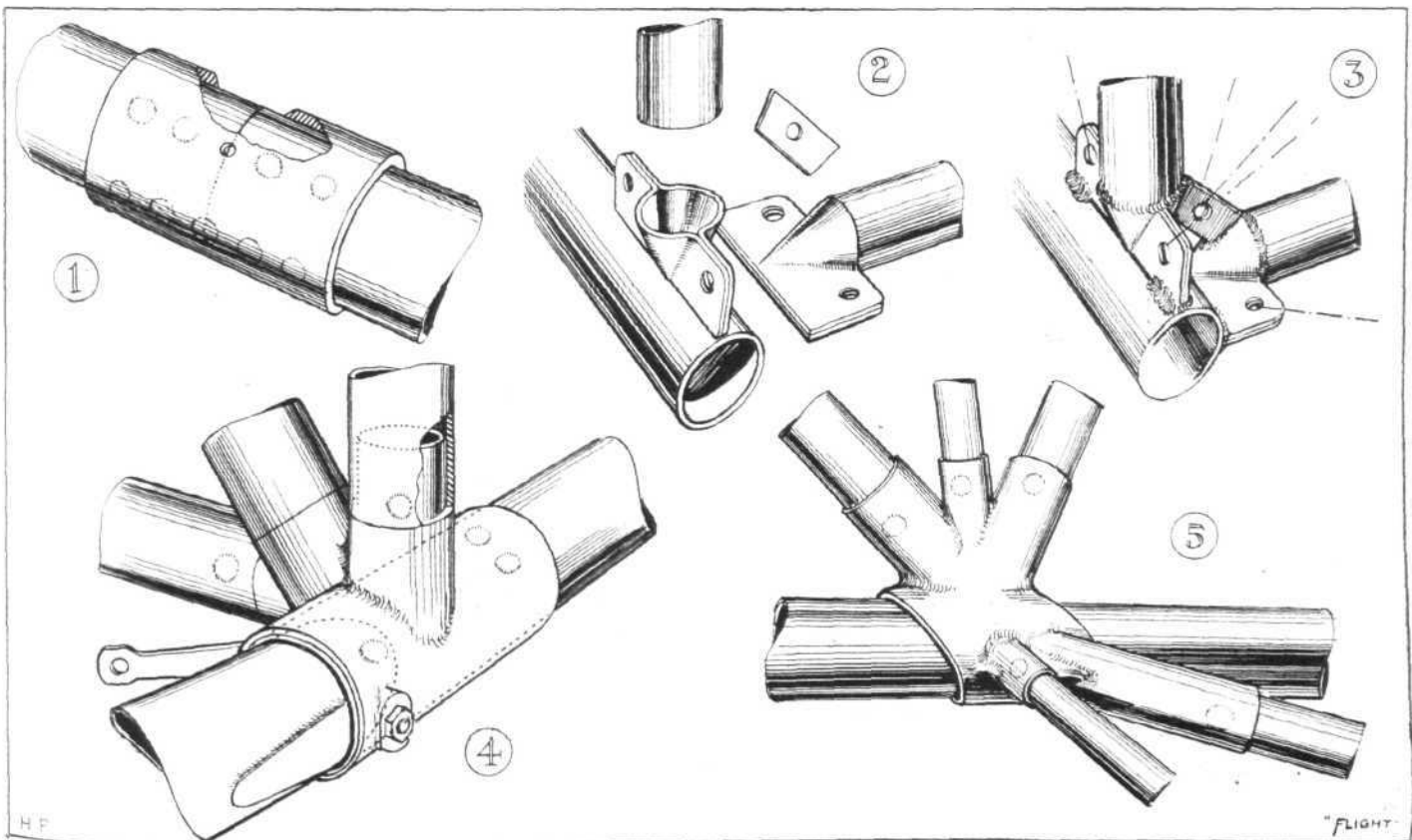
ALL-METAL construction, as regards service aircraft at any rate, may now be said to be a *fait accompli* at the works of all British aircraft constructors who build machines for the Royal Air Force. For commercial aircraft, and more particularly for the smaller types, all-wood and "mixed" construction is still employed and is likely to continue to be used for some time to come. To those of us who have been privileged to follow in some detail and at fairly close quarters the transition from wood to metal construction as it has matured at the various British works, the last year or two has been a period of quite remarkable interest. When the Air Ministry first announced the change in policy, and issued the ruling that within a certain period no more aircraft not of all-metal construction would be accepted, there was, very naturally, a good deal of speculation concerning the forms of construction which the various firms would evolve. One or two, or possibly three or four, firms had done a considerable amount of experimental work before it became, one might say, compulsory to do so, and were thus regarded by many as being in a more favourable position in the matter of changing over entirely to metal. Other firms had had no experience whatever of all-metal construction, and were faced with very serious problems. It speaks well for the British aircraft industry that without a single exception the firms have proved themselves capable of overcoming their difficulties, and there is now not one British aircraft firm which has not produced very creditable forms of structural components in metal.

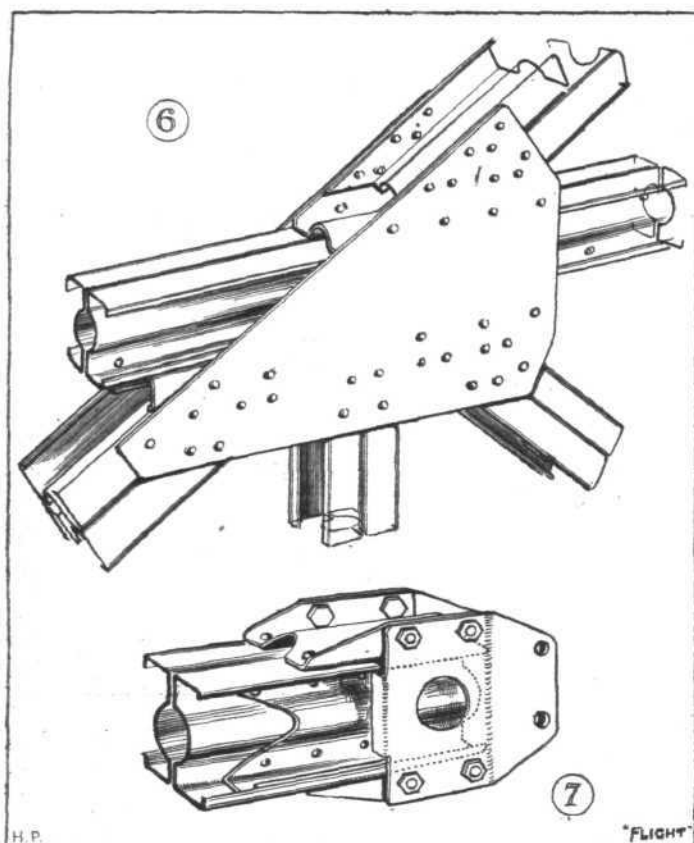
This is not the place for a discussion of the many problems which had to be solved, but as the uninitiated is liable to fail to recognise the magnitude of the task, it might not be amiss to call attention to some of the difficulties with which the British aircraft industry was faced. To begin with, the Air Ministry had no intention of standardising any particular type or form of all-metal construction, although it might have done so on the score of economy. Presumably it was held—and probably quite wisely so—that too early standardisation would hamper design and prevent full advantage being

taken of any structural weight-saving which a thorough exploration of metal construction might bring with it. The saving of weight, it might be pointed out, was not the primary reason for the change to metal construction, but the problem of adequate supplies in time of war. By giving aircraft constructors a free hand in evolving their own particular methods, the Air Ministry caused a vast amount of experimental work to be carried out, and one result of this policy has been that we have now almost as many distinct forms of metal construction as there are aircraft firms. And apart from the advantage of adequate supplies, it has been found that the all-metal machine is invariably lighter than its wooden prototype. In some cases the saving in weight is very material, in others perhaps less pronounced; but at least the change may be said in all cases to have been "on the right side of the ledger."

Apart from the experimental work involved in deciding upon various forms of construction, there was the cost of plant suitable for quantity production of aircraft in metal. In some cases firms have spent large sums of money on the equipment of their rolling and drawing plants. In others some very ingenious schemes have enabled constructors to produce the necessary sections etc. with a very simple and cheap equipment. The problems were not made any easier by the fact that frequently a metal component had to be produced to take the place of a part which had hitherto been made in wood. This fact was doubtless responsible for determining, in very many cases, the type of metal component produced, which had to fit into certain overall dimensions not necessarily the most advantageous possible with the newer material.

To add to the constructors' difficulties, workers who had become skilled woodworkers either had to be dismissed, or had, at a moments' notice so to speak, to change their trade and become metal workers. Neither alternative was very desirable, but there was no choice in the matter. Trade Unions were naturally interested, and in one or two instances objected to woodworkers entering the field of metal workers.

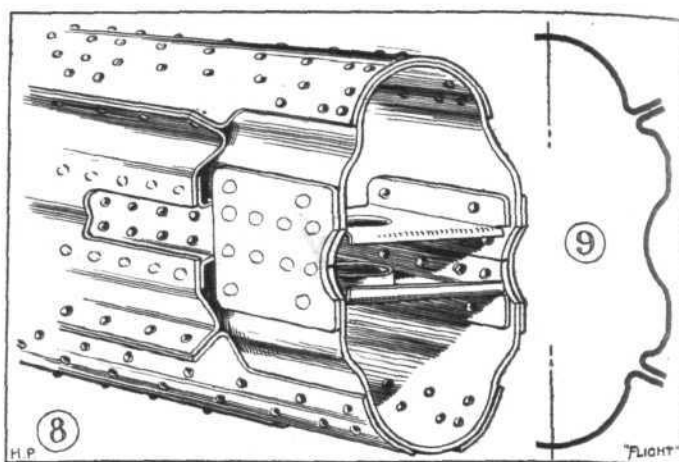




But taking it all around, the British aircraft firms have shown not only great engineering skill in evolving new forms of construction, but also considerable tact and diplomacy in dealing with labour problems arising out of the change-over to metal.

FLIGHT has already published illustrated articles dealing with the forms of construction of several British firms. This week we are able to continue the series with an article and sketches illustrating the forms of metal construction evolved by the engineers of Handley Page Ltd. So much has been written of the Handley Page automatic slots of late that one is somewhat apt to overlook the progress which the firm has been making in other directions, and it is therefore all the more interesting to find that metal construction is now in full swing at Cricklewood.

Unlike some British firms who have definitely chosen steel as their structural material, or others who have decided to concentrate exclusively on Duralumin, in the construction of the latest types of Handley Page aircraft one finds both materials used; steel mainly in the fuselage and Duralumin exclusively in the wings. In the following notes on Handley Page all-metal construction, reference is not made to any particular aircraft type, the constructional methods being



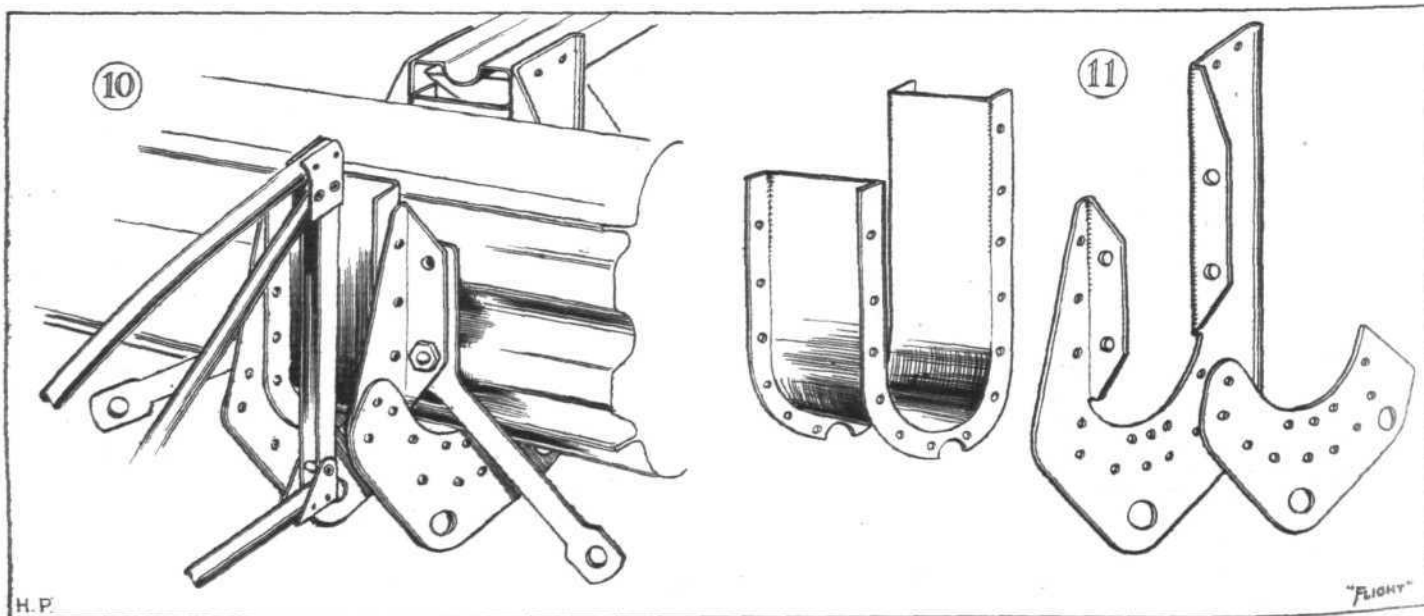
common to several types, although differing slightly in detail. By way of showing that in the case of Handley Page machines the change-over to metal has also brought with it a considerable saving in weight, it may be mentioned that in the case of one machine—a fairly large one admittedly—the metal version is 500 lbs. lighter than the older wooden type.

To take the fuselage construction first, this makes use of circular section steel tubes for its material, and the joining of one member to another is by welding. In certain parts of the fuselage, where two tubes are joined together, such as for instance a longeron joint, the two tubes are butt-jointed and a sleeve is slipped over the joint (see Fig. 1). A series of holes are then drilled through sleeve and tubes, and the holes are welded up. It has been found that in this manner the actual weld forms almost a rivet inside the holes, except that the metals are fused together. Somewhere on the sleeve, in line with the butt, one hole is left unwelded for inspection purposes.

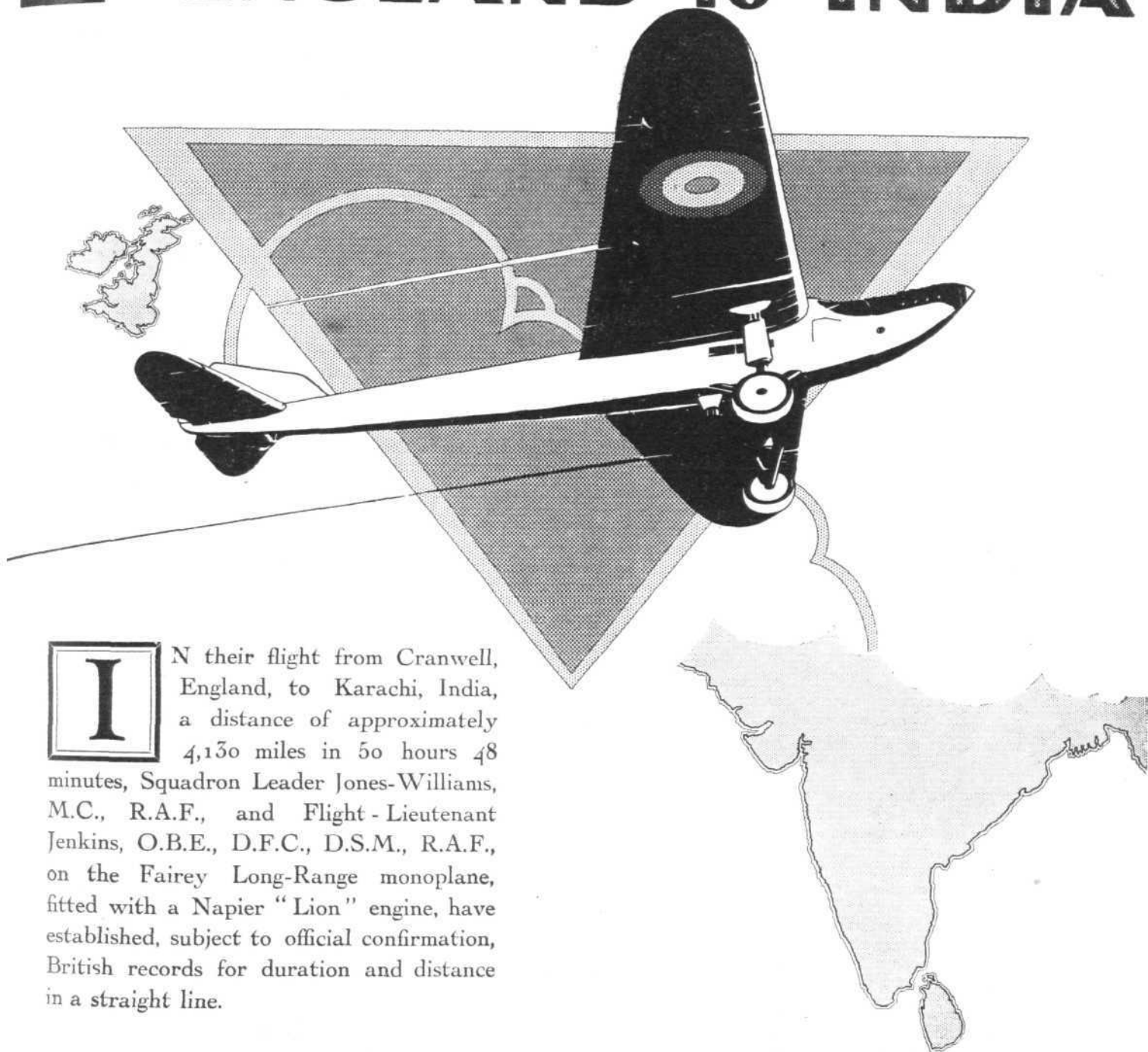
A form of joint which is really the basis for the whole fuselage construction is shown in 2. The strut "socket" is formed from two pieces of sheet steel welded to the longerons at the ends only, and to this socket is welded the end of the strut tube. The assembled joint is as shown in Fig. 3, and it will be seen that the longeron is held to the struts by the welds only. As, however, the angle of the bracing wires reduces the tendency for the struts to shift along the longerons, the welded joints on the latter are subject to shear loads only.

A different form of longeron joint is shown in Fig. 4, which represents the case where a longeron is stepped down in diameter. The larger tube passes through the sleeve, and the smaller goes inside it. The strut sockets are spot-welded to the longeron sleeve, and are joined to the struts by spot-welding through short internal sleeves. Yet a different type of joint, occurring towards the tail of a large machine, is illustrated in 5. Again the peculiar form of spot-welding is made use of.

On certain Handley Page machines the forward portion of the fuselage is built up of structural members of Duralumin



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IN their flight from Cranwell, England, to Karachi, India, a distance of approximately 4,130 miles in 50 hours 48 minutes, Squadron Leader Jones-Williams, M.C., R.A.F., and Flight-Lieutenant Jenkins, O.B.E., D.F.C., D.S.M., R.A.F., on the Fairey Long-Range monoplane, fitted with a Napier "Lion" engine, have established, subject to official confirmation, British records for duration and distance in a straight line.

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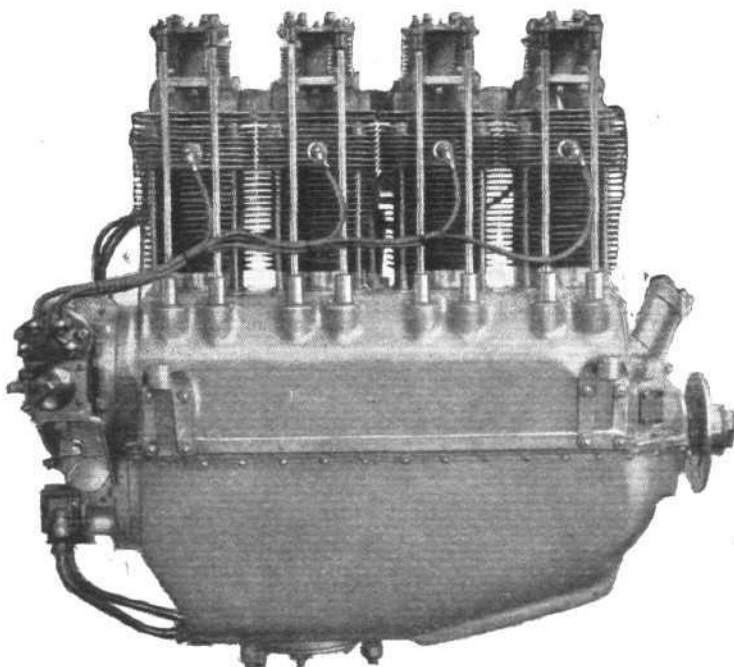
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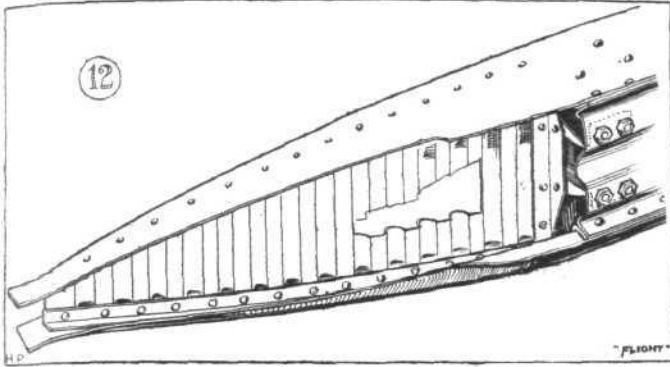
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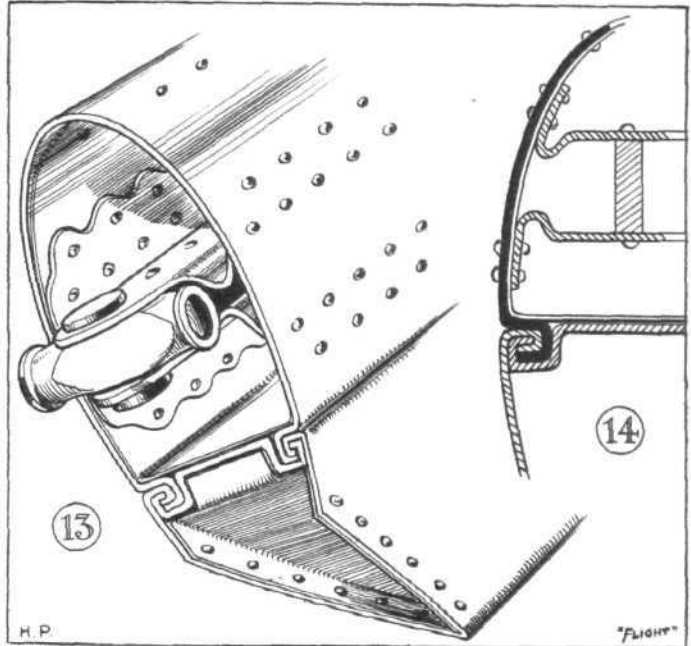


in order to reduce magnetic effects on compasses, etc. In such cases the longerons take the form illustrated in Figs. 6 and 7. Two hollow-backed channel sections are placed back to back and riveted, the turned-over free flanges being very convenient for attachment of other members, etc. Incidentally, the same, or a very similar, hollow-back channel section is used in the construction of wing ribs, of which more later. Fig. 7 also shows the manner of attaching the rear end of a Duralumin longeron to the forward end of a steel tube longeron.

In the wing construction Duralumin is, as already mentioned, used exclusively, this material being used for spars, ribs, compression ribs and inter-plane struts. A typical Handley Page main wing spar section is shown in Figs. 8 and 9, the latter illustration showing the actual spar section. This is built up of two corrugated webs and two semicircular flanges, the joints being by riveting. The flats on the sides of the web corrugations facilitate rib attachments, etc. Where compression ribs occur, internal stiffening plates are used, of the form indicated in Fig. 8.

Having evolved a good type of spar, one of the problems that arises is always how one is to attach to it the fittings for interplane struts. The manner in which Handley Page, Ltd., have solved the problem is shown in Figs. 10 and 11. It will be seen that simple flanged plates are used. Fig. 10 also shows the attachment of wiring plates for lift and anti-lift wires. At the wing tip the spars are tapered off, the webs of the main spars being cut away and thin corrugated webs being substituted, as shown in Fig. 12. The main top and bottom flanges are tapered off and continue right to the tip.

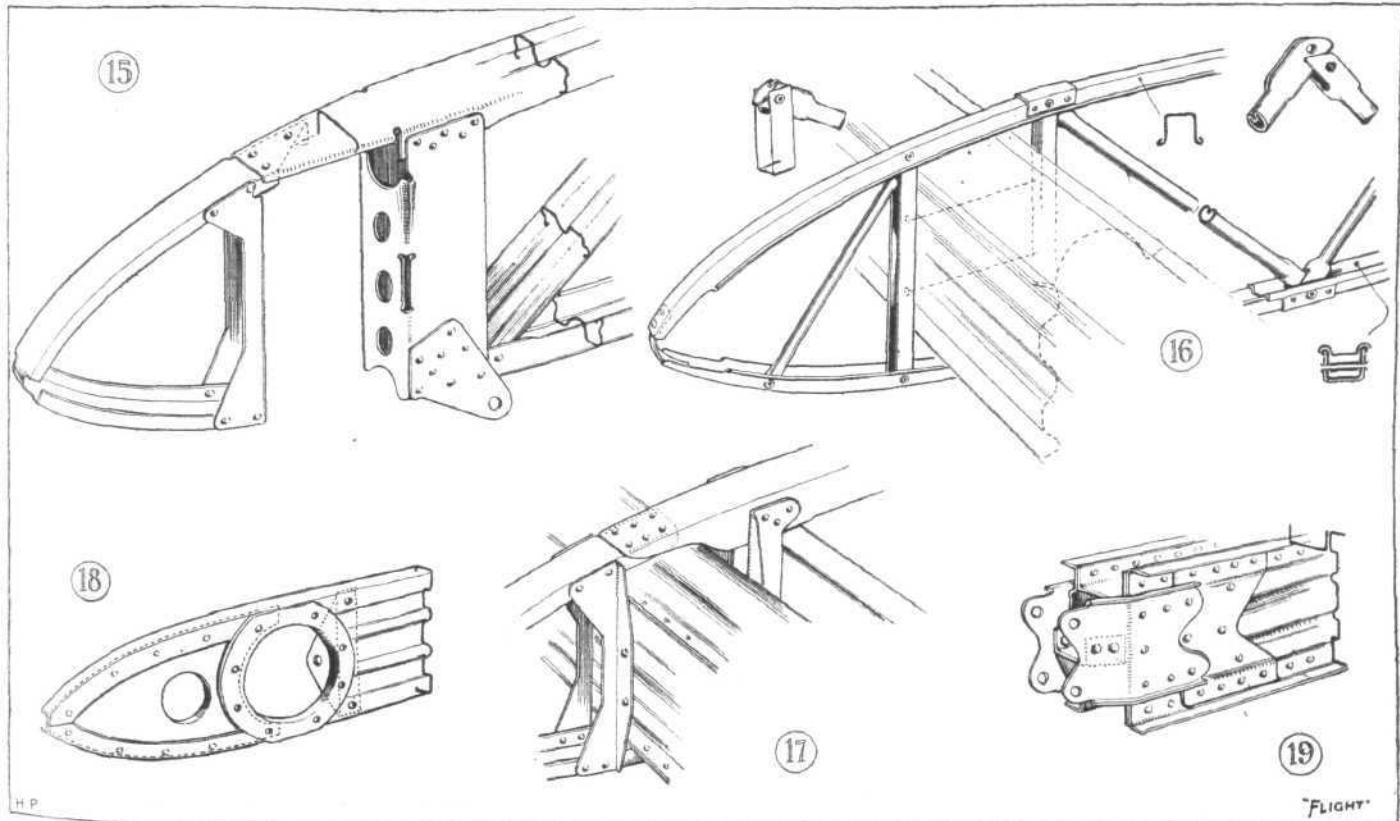
The inter-plane struts (Figs. 13 and 14) are built up of thick Duralumin sheet drawn to section (as are also the wing spars, ribs, etc., no rolling being employed). The strut consists



of a strong forward portion, a transverse internal web and a streamline tail fairing, the whole being assembled by a form of closed joint, as shown. Note should be taken of the trunnion in the strut end, which, in connection with the bolt through the fitting on the wing spar, forms a universal joint for the strut attachment, so that the joint can be used for a wide range of dihedral angles and stagger.

In the construction of the plain wing ribs extensive use is made of small channel sections for the flanges and circular sections for the braces (Fig. 16). These circular sections are made from flat sheet with the edges turned over inside the tube thus formed. Compression ribs, and ribs taking heavier local loads than the normal ribs, have flanges and braces of the same section as used in the forward portion of the fuselage. Such a compression rib is shown in Fig. 15, while a similar one (centre-section rib) with a slightly different form of attachment, is illustrated in Fig. 17.

Solid-drawn tubular Duralumin spars are used in the tail plane, and the tail ribs take the form shown in Fig. 18. Plain channel sections are used extensively for minor components, and the manner of assembling them into a tail plane compression strut is shown in Fig. 19.



THE BREDA "15"

An
Italian Light Monoplane
with
85 H.P. Walter Engine

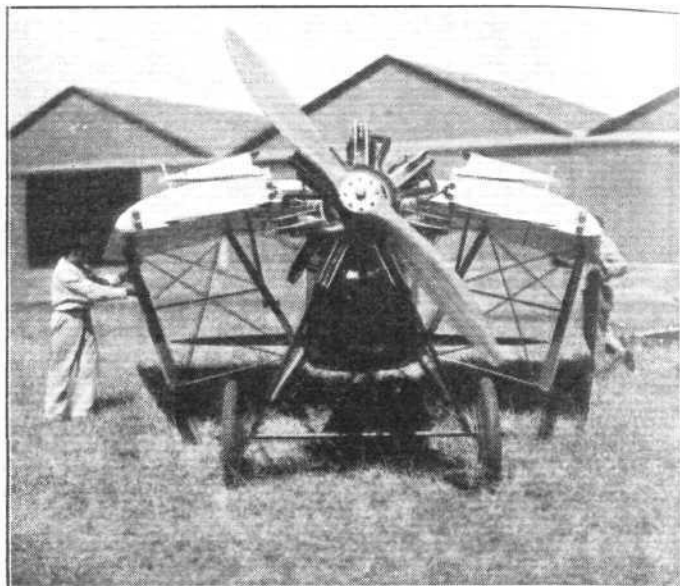
IN a previous issue of FLIGHT (March 15, 1928), we described the Breda A.7 monoplane, constructed by a well-known and old-established Italian engineering and aircraft firm—Societa Italiana Ernesto Breda, of Milan—which was a successful high-wing reconnaissance machine with a 500-h.p. engine. Since then this firm has continued its development of other types of aircraft, and we are able this week to give a description of one of its latest products.

Just recently the Italian Air Ministry put forward a programme for the encouragement of Civil Aviation, with the result that the "light plane"—or medium-powered touring aeroplane, as it is classed in Italy—received a large share of attention from aircraft designers. Several of these have been produced by various firms in Italy, among them the Breda Co., mentioned above, and it is to this machine our description refers.

The Breda "15"—the machine in question—also is a high wing monoplane, equipped with an 85 h.p. Walter air-cooled radial engine, although we understand that other power plants of similar horse-power can, if desired, be installed. With a view to providing the utmost possible comfort for the pilot and passenger—it is a two-seater machine—considerable attention has been devoted to the accommodation and the controls. As regards the former, the two seats, which are arranged in tandem, are enclosed in a roomy cabin, formed by extending the top of the fuselage from the tail up to the level of the wings, the roof, front and sides, in the vicinity of the seats being composed of windows of non-flam material, thus providing an excellent range of vision. The windows can easily be opened at will, so as to ensure proper ventilation.

The seats are well upholstered, and are so designed that parachutes can be carried without discomfort. Access to the cabin, which is 2 ft 3 in. wide, and 4 ft. high, is by way of two doors of ample proportions in the side of the fuselage. The Breda patent dual control is fitted, in which the pilot, who normally occupies the rear seat, can disconnect the front controls during flight.

The cabin is well equipped with instruments, which include air speed indicator, revolution counter, compasses, altimeter, petrol and oil gauges, fire extinguishers, etc. Complete



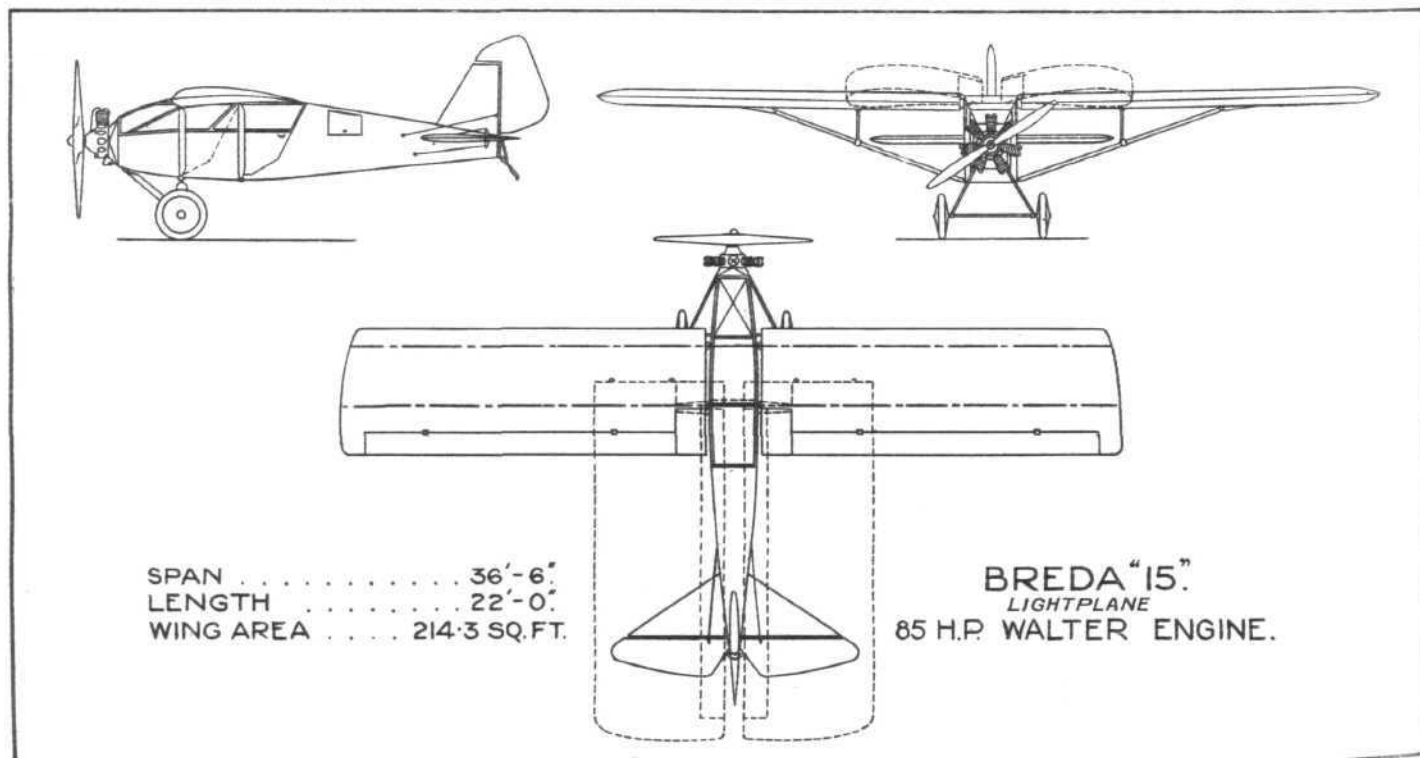
equipment for night flying is also fitted, including the regular four navigation lights, landing head light and cabin lighting, all supplied by a dynamo with "buffer" battery. Provision is, of course, made for carrying a normal amount of luggage.

As regards the construction—which is a combination of wood and steel tubing—of the Breda "15," this, we believe embodies several features of previous Breda practice, and special attention has been paid with regard to incorporating many interchangeable parts, thus ensuring the supply from stock of any spare part.

Although this machine has a comparatively low empty weight (926 lbs.) it is particularly robust, in fact we understand that every part in the construction has been tested under the same conditions and requirements which apply in the construction of the service machines produced by this firm. The wing has a factor of safety of 7.

The wings which are of fairly thick section, are of special design, giving a very good high/low speed ratio, and this is further improved by an arrangement whereby the incidence of the ailerons may be varied independent of and without interfering with their normal duties of lateral control. Ease and sensitiveness of control are characteristic features of the Breda "15" and a device has been provided which makes it possible for the pilot to set his controls in a given position and fly for long periods without further attention.

Another important feature is that the wings are made to



THE BREDA 15 : General arrangement drawings. Other engines than the Walter, of similar power, may be fitted.

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¶ FIRST NON-STOP FLIGHT FROM ENGLAND TO INDIA—4,130 MILES

Squadron-Leader A. G. Jones-Williams, M.C., and Flight-Lieut. N. H. Jenkins, O.B.E., D.F.C., D.S.M., made the first non-stop flight from England to India when they landed at Karachi on April 26th after flying for 50 hrs. 38 mins. without alighting, covering 4,130 miles. The machine was a Fairey monoplane with Napier engine.

¶ SPEED IN AIR

The highest speed ever accomplished in the air was achieved by Flight-Lieut. D'Arcy Greig, D.F.C., A.F.C., in November last, when he covered three kilometres at the marvellous average speed of 319.5 m.p.h. He flew a Supermarine seaplane with Napier engine. This same machine and engine, piloted by Flight-Lieut. S. N. Webster, A.F.C., won the Schneider Trophy at Venice in September 1927 at an average speed over 200 miles of 281.669 m.p.h.

¶ SPEED ON LAND

The highest speed ever attained on land was made by Major Sir Henry Segrave when he drove his Irving-Napier car over one mile at the amazing speed of 231.36 m.p.h.

Capt. Malcolm Campbell set up world's land speed records at Verneuk Pan with his Napier-Arrol-Aster as follows:—over 5 miles, speed 211 m.p.h.; over 5 kilometres, speed 216.53 m.p.h. They both used a Napier engine.

¶ SPEED ON SEA

The world's motor-boat speed championship was won at Miami by Major Sir Henry Segrave, driving Sir Charles Wakefield's Napier-engined "Miss England."

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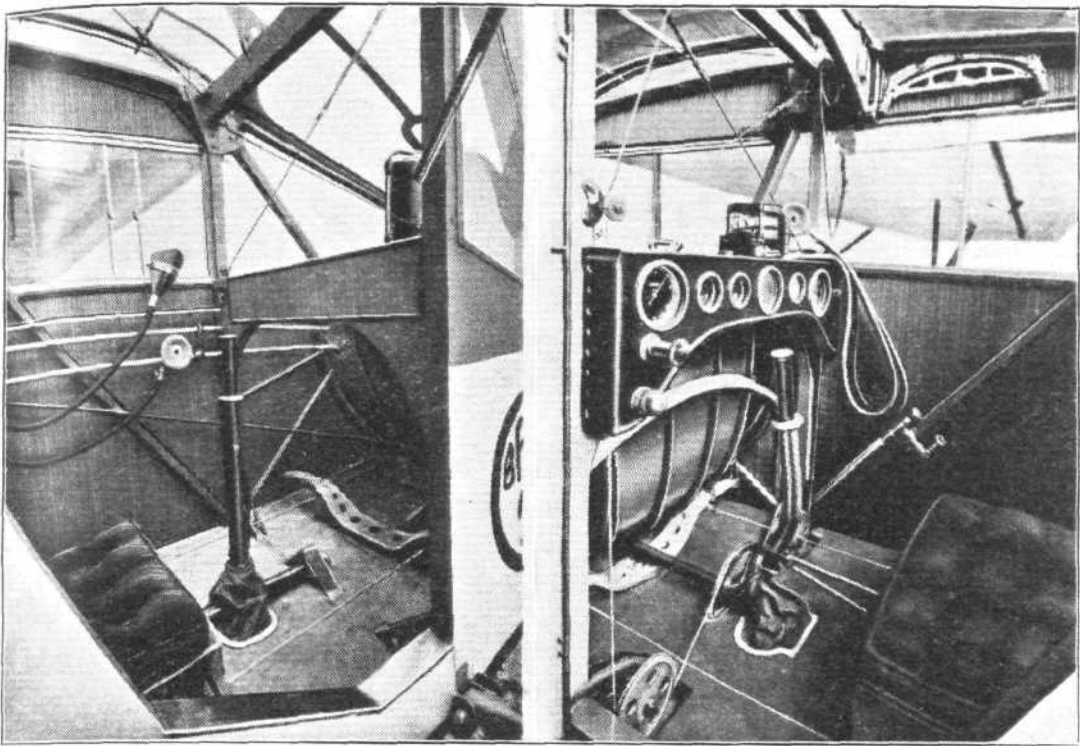
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The Breda 15 : Two views of the interior of the cabin, showing on the right the pilot's or rear seat, and on the left the passenger's, which is in front.

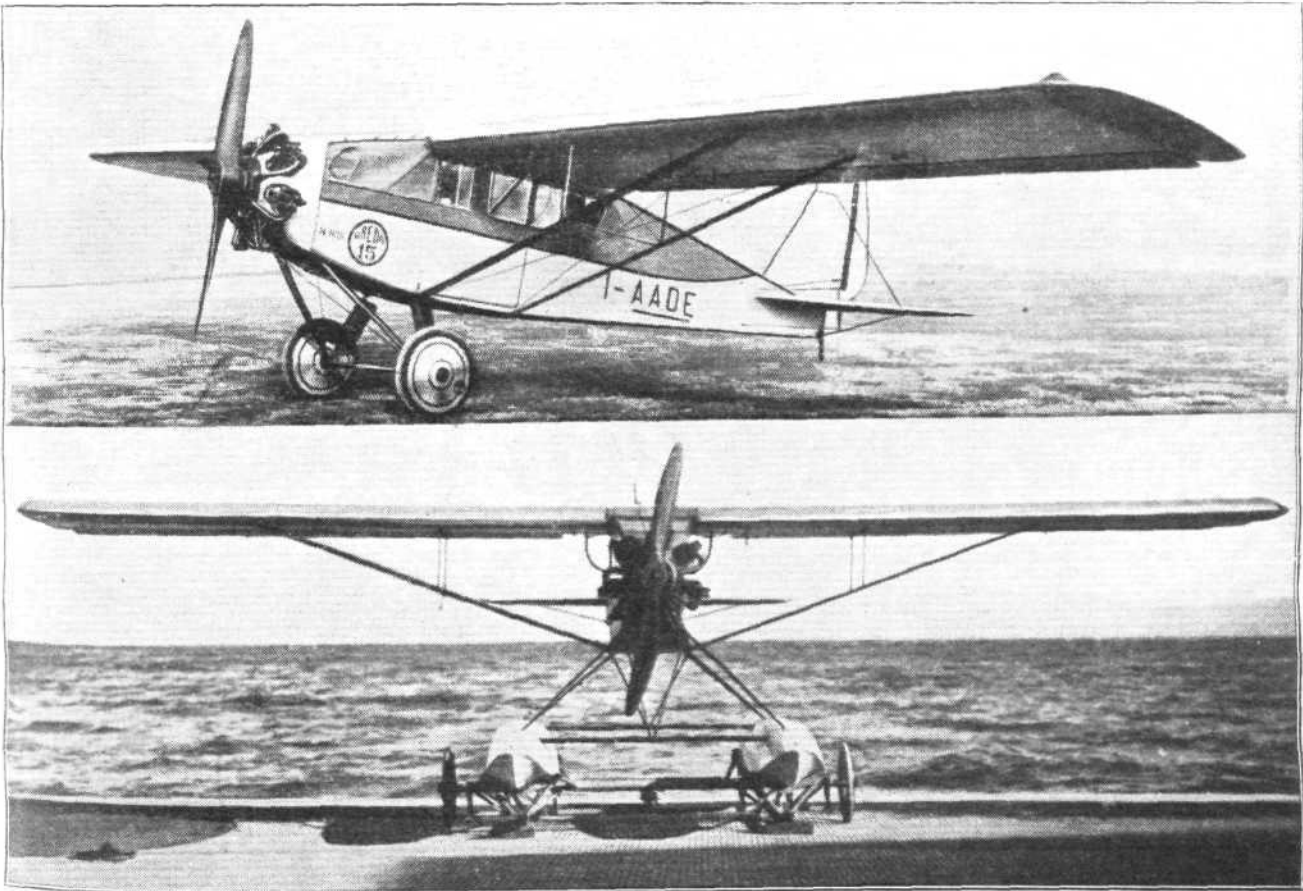
fold back along the fuselage—an operation easily accomplished without any special tools in a few seconds. It can also easily be converted from a landplane to a seaplane.

The Breda "15," in spite of its comparatively low power, has a very good performance, and excellent climbing qualities, it can carry out all aerobatic manoeuvres with full load. During the recent Italian Government Competition for light 'planes this machine put up an exceptionally fine performance.

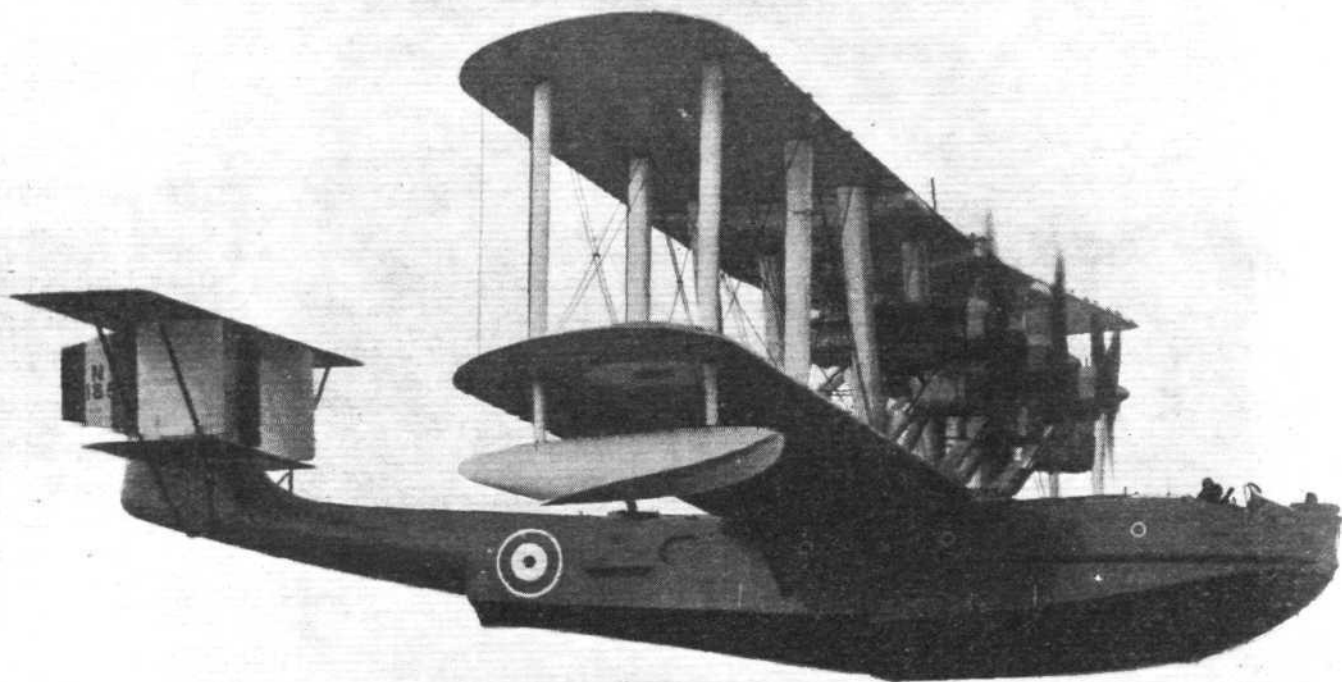
The principal characteristics, with 85 h.p. Walter engine are:

Span	..	..	36 ft. 6 in. (11·18 m.).
Overall length	..	..	22 ft. (6·75 m.).
„ height	..	..	8 ft. 3 in. (2·525 m.).

Width folded	..	..	11 ft. 6 in. (3·50 m.).
Wing area	..	..	214·3 sq. ft. (20 sq. m.).
Weight empty	..	..	926 lbs. (420 kg.).
Useful load	..	..	617·5 lbs. (280 kg.).
Total weight	..	..	1,543·5 lbs. (700 kg.).
Power loading	..	..	18·4 lbs./h.p. (8·22 kg./h.p.).
Wing loading	..	..	7·2 lbs./sq. ft. (35 kg./sq.m.).
Speed range	..	..	37–112 m.p.h. (60–180 k.p.h.).
Cruising speed	..	..	87 m.p.h. (140 k.p.h.).
Climb to 2,280 ft. (1,000 m.)	..	..	8 seconds.
Service ceiling	..	..	14,100 ft. (4,300 m.).
Endurance with full load	..	..	6 hours.
„ with pilot only	..	..	12 hours.



THE BREDA 15 : Two views of the new Italian light 'plane. In the lower picture it is shown as a seaplane.



BY FLYING BOAT TO INDIA

SIR PHILIP SASOON'S TOUR IN THE BLACKBURN "IRIS"

Lecture by Sq.-Ldr. C. L. SCOTT, D.S.C., before R.Ae.S.

SQDN.-LDR. C. L. SCOTT delivered a lecture before the R.Ae.S. and Inst.Ae.E., on April 25 last, concerning the cruise to India and back carried out last year by Sir Philip Sassoon in a Blackburn "Iris" flying-boat. As there are many points of interest, we give below this lecture in full.

"Objects of the Flight"

"The objects of this flight were (1) to enable the Under-Secretary of State for Air and the Director of Equipment, Royal Air Force, to inspect as many as possible of the Royal Air Force Units in Egypt, Iraq, India, and Malta, and (2) to get some information on the behaviour of a large flying-boat operating under tropical conditions away from its base.

"The Aircraft"

"The flight was carried out in the Blackburn 'Iris II' flying-boat with duralumin hull, fitted with three Rolls-Royce Condor IIIA engines and four-bladed wooden propellers painted with cellulose paint. Dual control was fitted and the two pilots sat side by side.

"The fuel was carried in three tanks attached to the under side of the top centre section over the three engines. Each of these tanks had a capacity of 300 gallons and was fitted with a fuel contents gauge on the underside. Pipes were led from each of these tanks to a central junction box in the lower centre section and from this junction box three pipes were led to the three engines. Cocks, capable of being operated from inside the hull, were fitted to these six pipes and thus complete control of the fuel supply was obtained.

"It was found in practice that, with all cocks on, the fuel did not drain equally from the two outboard tanks, and loss of lateral trim soon became noticeable. This was easily rectified by temporarily shutting off the supply from the tanks which contained the less fuel.

"A biplane tail was fitted and there were three rudders, a servo rudder being fitted to the centre rudder only. The servo gear could be put out of action by means of a clutch operated from the pilot's cockpit. Two elevators were fitted, the upper and larger one being operated in the ordinary way by the control column, and the lower one being operated by means of a lever in the pilot's cockpit. This fixed elevator took the place of an adjustable tail plane.

"A small duralumin dinghy weighing about 80 lbs. was carried in an inverted position in the lower centre section. This dinghy carried five people and proved to be very useful.

"Personnel and Loading"

"The crew consisted of two pilots, two fitters, one W/T. operator and one rigger. The passengers were Sir Philip Sassoon, Under-Secretary of State for Air, Air-Commodore Longmore, Director of Equipment, and a servant.

"The normal service load of the 'Iris' with 680 gallons of fuel is 27,400 lbs. On this flight, with full fuel (900 gallons), the gross load was 30,350 lbs. For most of the stages only 700 gallons of fuel were carried, and this reduced the gross load to 28,850 lbs. The maximum gross load at which the 'Iris' has been flown is 33,000 lbs.

"The Flight"

"The 'Iris' left Felixstowe on September 27 for Plymouth. Refuelling was carried out on arrival, and the next day was spent in having a general

look over the machine and engines. The passengers joined the 'Iris' early on the morning of September 29, and we left for Hourtin, near Bordeaux at 06.55 hrs. A certain amount of low cloud was encountered in the Channel and there were some very unpleasant hailstorms in the neighbourhood of Ushant.

"After Ushant was passed the weather improved and we had practically no trouble from weather for the remainder of the outward trip. We landed near the French Seaplane Station on the lake at Hourtin and took in 400 gallons of fuel in just over an hour.

"Berre, near Marseilles, was reached just before dark the same day. From here Aboukir was reached in three days, via Naples and Athens. At Aboukir the passengers left the 'Iris' and proceeded to Khartoum and then across the desert route to Iraq by land aircraft.

"The 'Iris' spent six days at Aboukir during which time everything was carefully inspected. The only defect found in the engines was excessive wear in several of the bushes in one rocker box. The complete rocker box was removed and a new one fitted.

"We left Aboukir for Alexandretta on October 8, and it was on this occasion that difficulty was first experienced in taking-off with no wind. The tanks had been filled up to 800 gallons and the gross load was 28,820 lbs. Two attempts were made to get off, but on neither occasion could an air speed of 40 knots be exceeded. One hundred gallons of fuel were then taken out reducing the load to 28,070 lbs.

"Another failure was experienced, due to a slight swell which was running. Each time the fore part of the hull struck a swell the speed was noticeably reduced. The final attempt was made close in shore to avoid the swell and here we got off after a very long run. Our intention was to leave Alexandretta on October 10. We climbed to a height of 5,500 ft., but we were unable to get through the mountain pass owing to clouds and rain storms.

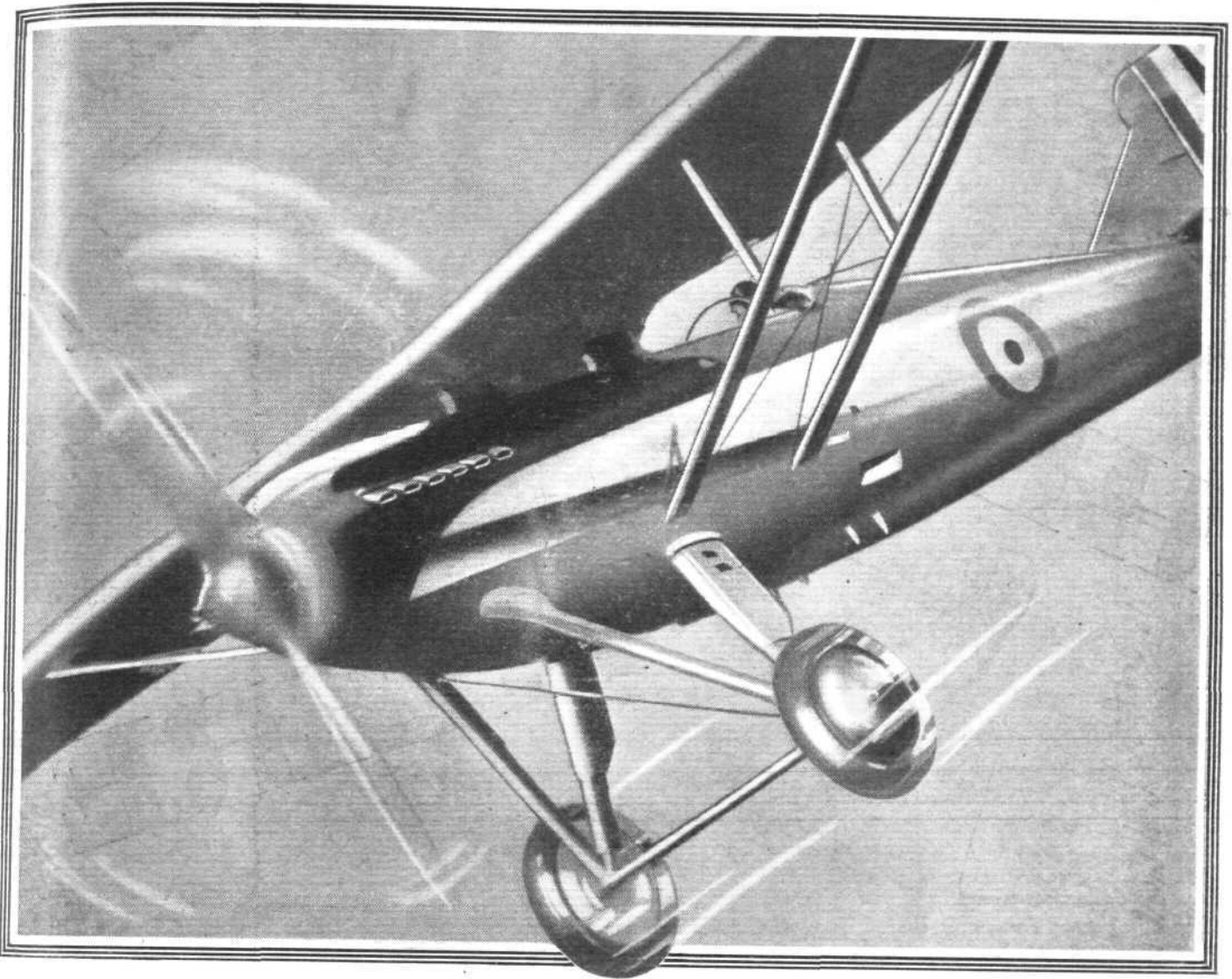
"The weather was better the next day and we went through the pass at a height of 4,000 ft. and picked up the Euphrates at Meskene after flying over the desert for about 1½ hrs. The river was followed and a height of over 4,000 ft. was maintained because below this height the air was uncomfortably bumpy. We landed on the large lake of Habbaniya, about 60 miles short of Baghdad, shortly after mid-day. This was done as it was thought that it would be very difficult to bring the 'Iris' down in exactly the right spot in the Tigris in the mid-day bumps.

"The soundings of the river we had, showed that an error of a few yards to one side or the other of a definite line would mean running aground on a sand bank. Those who have flown large machines in the mid-day heat of Iraq will, no doubt, appreciate this point.

"We anchored in the middle of the lake, rigged the awning over the fore part of the hull, had a meal, and left for Hinaidi about an hour before sunset. The next day we left for Basra, spent one night there, and then left for Henjam with our passengers on board once more.

"It was when within about 100 miles of Henjam that our troubles began, the starboard engine suddenly dropped from 1,900 r.p.m. to 1,600 r.p.m. The engine ran quite steadily at this speed and there was no vibration, so it was decided to carry on.

"After landing at Henjam it was found that when the engine was turned the A side camshaft remained stationary. On examination, the lower



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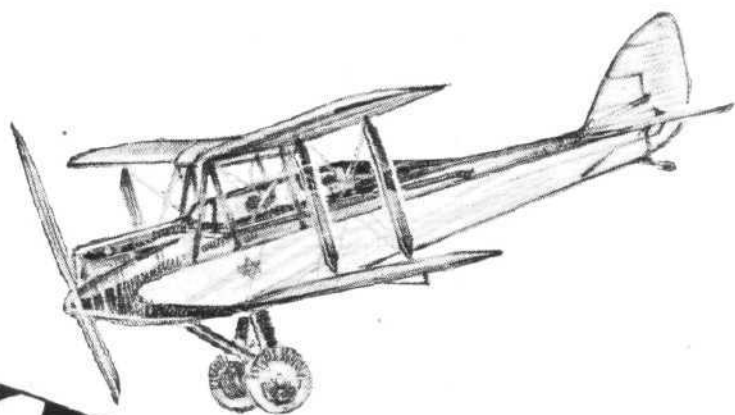
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camshaft drive housing was found to be fractured, thus allowing the bevel wheel at the bottom of the inclined shaft to come out of mesh.

"H.M.S. 'Crocus,' a sloop operating in the Persian Gulf, was at Henjam and we took the broken part on board her with a view to getting it repaired. The E.R.A.'s on board undertook the job, which was by no means an easy one. They cut away the broken parts of the upper portion of the housing and turned up a new lower portion out of solid brass. The two parts were spigotted together and pegged with four copper rivets. This was not finished until about four o'clock the next morning, and as soon as there was sufficient light the repaired housing was refitted to the engine.

"Great difficulty was again experienced in getting off at Henjam, as there was only a very light wind (2-3 m.p.h.) off the shore, and the tanks had been filled to their full capacity in the hopes of making a direct flight to Karachi (a distance of 630 sea miles) without refuelling at Gwadar. The first attempt to take-off was made from a point about 1½ miles from the beach. It was found that owing to the lee of the land there was a belt of calm extending about three-quarters of a mile out from the beach, and in this calm the maximum air speed attainable was about 40 knots. Two more attempts were made from farther out to sea, but again we ran into the calm belt and had to give it up. The final and successful attempt was made from a point about four miles from the shore.

"When once in the air the load was carried without difficulty. We climbed to 4,000 ft. to get away from the uncomfortable heat and all seemed well. However, after 1½ hrs. in the air, the starboard engine again dropped to 1,600 r.p.m. By this time we were within about 20 miles of Jask and it was decided to land there rather than carry on at the risk of more serious damage to the engine. We anchored a few hundred yards from the shore near the Eastern Telegraph Company's Cable Station.

"It was found that the copper rivets put in by the 'Crocus' had sheared and that the two parts of the housing had come apart. Fortunately, no further damage had been done to the engine. The housing was taken ashore and, out of a box of scrap, some small steel bolts were found and these were screwed in place of the copper rivets. A tap was improvised from one of

Jask, the engine began to break up altogether and was switched off. We began to lose height again and it was only by making for a gap in the palm trees that we managed to cross the narrow neck of land beyond which was the anchorage which we were trying to reach.

"On examining the starboard engine a good view of a very dry and overheated looking big-end and a broken connecting rod, was obtained through a large hole in the side of the crankcase. A message was sent to Karachi from the Cable Station asking for a land machine to take the passengers on to Iraq, and for the new engine to be sent to Jask as soon as possible.

"The 'Hinaidi,' in which the Under-Secretary of State had done most of his tour in India, arrived the next day and landed on the aerodrome about two miles from the Cable Station. An early start was planned for the following day, Friday, October 26, but, owing to a little trouble with the Persian authorities, the 'Hinaidi' did not get away till about two hours after dawn. However, they made a very good flight and arrived at Basra the same evening refuelling at Bushire on the way.

"A signal was received saying that our old friend the 'Crocus' was arriving at Jask at dawn the next day to give us a hand and that the new engine would arrive by s.s. 'Varsova' late the following Monday night. The 'Crocus' duly arrived and we began preparations for changing the engine. A very good engine lifting gear had been made by Blackburns but, although it only weighed 120 lbs., we did not like to increase the overload by carrying it in the 'Iris.' This gear consists of a duralumin tubular derrick about 16 ft. long, made in two halves for easy stowage. At the lower end is a hemispherical socket which fits on to a ball fitting riveted to the top of the lower front main spar in the centre section. A radius wire is taken from the top of the derrick to a pin on the top plane directly over the ball fitting, and thus the derrick is able to swing round on the ball joint. A small hand winch is fitted to the lower half of the derrick and from this the lifting wire is led over a pulley at the top end. The length of the radius wire is such that, when the derrick is swung outwards, the pulley at the top is directly over the centre of the engine.

"The problem before us was to rig up a lifting gear on these lines. A



BY FLYING-BOAT TO INDIA: Sketch map of the route followed, out and home.

these bolts to make a screw thread in the holes. By this time it was too late to proceed, and we spent the night at Jask. We left early the next morning and reached Karachi without further incident after a flight of 6 hrs. 40 mins.

"The next day the improvised housing was examined and the two portions fell apart as it was taken out of the engine. It certainly would not have lasted more than another 10 mins. in the air. We had hoped to find a new engine waiting for us at Karachi, but, unfortunately, this was held up at Bombay and the ship carrying it was not due at Karachi for about a week. Our programme only allowed us nine days at Karachi, so it was decided to have a complete new housing turned out of solid brass at the R.A.F. Depot in case the new engine did not arrive in time. This was done and the new housing fitted and a successful test flight made.

"We were due to leave Karachi on Wednesday, October 24, and the new engine arrived on the Sunday before and was unloaded on the Monday. This meant that it would not be possible to change the engine without delaying the start and, as the starboard engine had run perfectly for about seven hours since the failure of the housing, and as there was no sign of any internal damage, it was decided to take a chance on the old engine. This was an unfortunate decision as we very soon found out. The two lower camshaft drives were taken out of the new engine and one was fitted in place of the brass housing, and the other one was taken as a spare.

"During our stay at Karachi our passengers had been taken a round of the R.A.F. Units in India by land aircraft. They returned to Karachi on October 23 and we started the return trip early the next morning.

"The Return

"Refuelling was carried out at Gwadar and all went well till we were about 75 miles east of Jask, flying at a height of about 2,000 ft. Suddenly oil was seen to be leaking out of the front starboard engine, and the oil pressure gradually fell away to zero. The engine was throttled right back and the other two were opened full out, but height was gradually lost at an air speed of 65 knots. Height might have been maintained at 60 knots, but at this speed there was not sufficient rudder control to keep the machine from turning to starboard.

"At 500 ft. the starboard engine had to be opened up to about 1,300 r.p.m. in order to keep height. This proved a bit too much for an engine running without oil, and about half an hour later, when about three miles short of

suitable iron water pipe was found ashore and a socket was made by the 'Crocus' for the lower end: also an attachment for the radius wire and for a chain purchase at the upper end. When this gear was rigged up it looked quite a fair imitation of the real thing, moreover, it worked quite well. The 'Iris' was now made fast astern of the 'Crocus' and we were all given accommodation on board. As there was practically no tide, the 'Crocus' and the 'Iris' both rode head to wind, but on one or two occasions, when the wind changed, the 'Iris' swung before the ship did and was a little troublesome.

"One evening we were all in the ward-room having a little refreshment before dinner when the boatswain came in, saluted smartly, and without a smile on his face said to me, 'Your ship is coming alongside, sir.' We went on deck and found that the wind had changed and it was just a question of fending off the 'Iris' till both 'ships' had taken up the new direction of the wind.

"The starboard engine was lifted off its bearers, lowered into a whaler and hoisted on board the 'Crocus' by Sunday evening. The next day was spent in removing the two lower camshaft drives which would have to be put back into the new engine and in preparing for its installation.

"The 'Varsova' arrived at 10 o'clock that night, and the new engine was transferred to the 'Crocus' by means of a native boat. This operation took about three hours. Our fitters, assisted by the E.R.A.'s, started work at once and replaced the two camshaft drives which had been removed at Karachi, and re-timed the camshafts. They worked nearly all night and by 8 o'clock the next morning the new engine was lowered on to a platform made by lashing two whalers together side by side, and laying planks across them. Two hours later the engine was in position in the 'Iris' and the lengthy job of connecting up all the pipes, and refitting the cowlings, was begun.

"By 4 o'clock the next day all was ready for test and we planned to get to Henjam (a distance of 120 miles) that evening. However, our troubles were not yet over and this was not to be.

"A test flight revealed a water leak in the new engine, which was soon rectified and a further test flight was made. On landing we found that a valve was blowing badly in the port engine. My crew worked right through the night, removed the cylinder with the defective valve, fitted and ground in a new valve, and all was ready by 7.30 the next morning.

"During the night the E.R.A.'s dismantled the old engine and removed one cylinder in case this might be required. This cylinder we took with us as a spare. At 8 o'clock on Thursday, November 1, we resumed our westward flight.

Henjam was reached in an hour and a half, refuelling was carried out, and two hours later we left for Basra.

"On approaching Abadan (about 30 miles short of Basra) we saw a very bad dust storm ahead and had to land in the Shat-El-Arab. Two minutes after we landed, the whole place was covered with dust like a thick fog. We anchored for the night and owing to bad weather were unable to get on to Basra till the following afternoon.

"About an hour after leaving Basra, the next day, the centre engine began giving trouble (obviously due to a constriction in the fuel supply) and had to be throttled down to about 1,400 r.p.m. Soon after this rain was encountered and when within about 30 miles of Hinaidi we had to fly at 500 ft. to get under the rain clouds. Ten minutes later the port engine began to give out and vibrated in alarming manner. We had some difficulty in getting down into the Tigris, which is very winding in this part.

"On examining the petrol filters we found that they were badly choked up with fine mud. These were cleaned, but we decided to do the ten miles to Hinaidi on the water as our luck in the air did not seem to be too good.

"The river was very low and we had touched bottom several times, so we sent a wireless signal to Hinaidi asking for a motor boat to be sent to pilot us along the river. In the meantime we got along as best we could. We got as far as the bend where the Diala river joins the Tigris, but we ran aground repeatedly in trying to get round this bend. Finally, we took a native on board and he guided us past the shallows and then we got on quite well. Later, he ran us on to a sandbank when we were doing about 15 knots and the sudden deceleration was very unpleasant. It was then that we sighted the motor boat which had been sent out to meet us.

"The difficulty of navigating this part of the river may be judged from the fact that when we first saw this motor boat, which had a draught of about 18 ins., it was itself aground on a sandbank in the middle of the river. Hinaidi was eventually reached and we made fast to a barge which was moored across the stream near the R.A.F. Hospital.

"The start next day was delayed till 11.40 a.m. by a thick morning mist. Refuelling was carried out at lake Habbaniya to avoid the difficulty of getting off the Tigris with a big load of fuel. Aboukir was reached on November 6, one night being spent at Alexandretta on the way.

"A rather anxious time was experienced on the flight from Habbaniya along the river to Alexandretta. After about three hours in the air the river became obscured by low clouds. A compass course was steered, and fortunately we were still over the river when, half an hour later, the clouds cleared. If the clouds had lasted longer and the river been lost, we should have been in a very awkward position as the desert here is practically featureless and we should have had to rely on dead reckoning only to hit off the mountain pass about 250 miles away.

"A certain amount of anxiety was also felt as to whether the pass would be free from clouds when we reached it. We tried to get information on this point by wireless, but were unable to do so. Our anxiety was allayed by the presence of the Lake of Antioch, which lies a few miles to the eastward of the pass, which could be used to land on if the pass was filled up with clouds.

"Our passengers were still waiting for us when we reached Aboukir and we left for Malta the next day, refuelling at Sollum and spending the night at Benghazi.

"Two nights were spent at Malta, and the first whole day without any flying since leaving Jask was much appreciated. We left Malta at 9.40 a.m. but were unable to get round or over bad rain storms, and had to return after 1½ hrs. in the air. We finally got away at 1 o'clock, flew through the Straits of Messina, and got to Naples just as it was getting dark.

"We were lucky on this occasion as, with the aid of a following wind, we made good 83 knots ground speed. Without this wind we should not have been able to make Naples before dark.

"The rest of the trip home was without incident, except for very bad weather south of Ushant. Low rain clouds were encountered and we had some difficulty in getting through them. We spent one night at Naples, Berre and Hourtin, and arrived at Calshot on November 13. Here our passengers left the 'Iris' which proceeded to its home at Felixstowe the following day.

"Fuel Consumption

"Great difficulty was experienced in estimating with any degree of accuracy the quantities of fuel used on the various flights. The exact contents of the barrels in which the fuel was usually supplied, was often doubtful, and there was always a certain amount left in the barrels which could not be sucked out by the pump. The average fuel consumption for the whole trip appeared to be about 95 gallons an hour.

"Refuelling

"The refuelling was carried out by means of a Zwicky pump, 4-in. bore by 4-in. stroke, through 1-in. internal diameter petroflex hose. The lengths of hose carried were two 15-ft. lengths and one 30-ft. length. A fine gauze filter was fitted on the suction side of the pump. The pump was mounted on a special mounting on the starboard lower centre section, and the delivery from the pump was through one 15-ft. length of hose to the junction box in the middle of the lower centre section. The fuel was usually supplied in 50-gallon barrels, and this was found to be by far the most convenient form. At Hinaidi and at all refuelling places east of Hinaidi, the fuel was supplied in 5-gallon drums. A lot of time was always wasted in opening these drums as there seemed to be no other way of unscrewing the stoppers except by means of a cold chisel and a hammer. The opening in the drums was too small to insert the hose, and the fuel had to be poured from the drums into some form of container (a small galvanised iron bath was used at Basra), and the fuel sucked from this by the pump.

"Another disadvantage of the 5-gallon drums is that the fuel did not seem to be so clean as that in the 50-gallon barrels. Also there was always a certain amount of dust and dirt on the top of the drums, and as the fuel was poured out some of this was carried into the container with the fuel. This was specially noticeable at Basra on the return trip.

"The fuel was brought alongside the flying-boat in some form of boat or motor boat. At Berre the fuel was brought alongside on a large flat-topped raft and this was found to be a very convenient arrangement. The position of the pump mounting was very convenient and was such that two men could operate the pump if necessary. One man could operate the pumps fairly easily, but usually there was plenty of labour available, and it was operated by two men.

"Remarks on the 'Iris'

"I have very little but praise for the 'Iris' and I don't know of any other flying-boat in which I should have preferred to carry out a trip of this nature. The 'Iris' is good on all controls and is not at all tiring to fly, in spite of her size.

"We had very little bumpy weather to contend with, but on one occasion a strong wind, blowing from the high mountains of Corsica, caused some very violent disturbances in the air, and even then the 'Iris' proved remarkably controllable, although the motion was anything but pleasant.

"The pilot's cockpit is very roomy and comfortable and access to the hull from both pilots' seats is easy. There is even room for a third person to sit between the two pilots, and just a little behind them, and from this position a very good view can be obtained. The internal arrangements of the hull are good and include a navigator's desk large enough to take an ordinary Admiralty chart and ample accommodation for the wireless operator and his apparatus.

"Two wicker armchairs were provided for the passengers and a small folding table which was used for meals in the air. Four bunks were rigged amidships of which two were usually full of light kit, overcoats, etc. The other two were frequently used for the purpose for which they were designed and appeared to be very comfortable. Further aft there was a 'Clyde' cooker, fitted with two Primus stoves. This came in for quite a lot of use both in the air and on the water.

"When flying, the noise inside the hull was not excessive, and it was possible to carry on a conversation without difficulty. Conversation was also possible in the pilots' cockpit, but was not so easy.

"The ability to move about the boat with ease, and have an occasional rest down below, as it were, and to have really comfortable meals, was found to reduce fatigue to a minimum.

"The difficulty of taking-off with no wind must now be considered. Designers of flying-boat hulls have always been faced with the difficulty of hitting off the happy medium between the flat bottom for quick take-off and the deep V bottom for easing the shock of landing. The maximum load at which the 'Iris' will take-off a calm sea with no wind appears to be about 28,000 lb. The maximum load at which she has ever taken off is 33,000 lbs. with a wind of about 15 m.p.h., and it has been estimated from test figures that she would be able to fly at a load of about 40,000 lbs.

"Hence the difference between the maximum flying load and the maximum load at which it is possible to get off with no wind is about 12,000 lbs.

"The bottom of the 'Iris' is of a deep V section and the normal draught is 3 ft. 10 in. The sides of the V are so concave that, where the plates join the keel, they are nearly vertical. On landing, this sharp keel cuts into the water and reduces landing shock to a minimum, but as soon as the keel touches the water, the deceleration is very noticeable, which shows that the resistance in the water is considerable. It is considered that this water resistance accounts to a large extent for the difficulty of taking-off with no wind. It must also be remembered that when the boat is nearly off the water, there is practically no lift, due to hydroplaning as the submerged portion of the hull forms such an acute angle.

A few take-off figures may be of interest.

Load, lbs.	Wind Speed miles hour.	State of sea.	Time of take-off, secs.
27,000	0	Calm	31
28,000	0	"	60
29,000	3	"	38
30,000	4	"	44
32,000	4	"	54
33,000	15	"	62

"It will be seen that a wind of only 3 m.p.h. reduces the time of take-off with no wind by 22 secs., even when the load has been increased by 1,000 lbs. This seems to suggest that only a slight modification to the hull shape might result in a big improvement in the take-off. This idea is confirmed in practice.

"On the occasions when we failed to get off, an air speed of 40 knots could be attained without difficulty, but this speed could not be exceeded. The impression felt was that if the keel would skim over the water, instead of cutting through it, and give a little lift instead of only drag, the speed would increase and reach take-off speed.

"Another disadvantage of the deep V is that if the 'Iris' is landed with even a slight drift, an uncontrollable turn of about 120° takes place a few seconds after touching the water; the danger of this when landing in a river where it may be necessary to land slightly out of wind, is obvious. This is probably due to the fact that, as soon as the keel touches it bites into the water, and a side pressure is set up due to the drift, and as the hull sinks deeper into the water, the centre of pressure moves further forward. As soon as this centre of pressure is forward of the c.g. of the machine, a horizontal turning moment is set up. It is thought that this difficulty might be overcome by rounding off the keel a little so that it could skim sideways over the water and thus take up the drift more gradually.

"A great advantage of the deep V was experienced when taking-off in a swell with a fairly strong wind. Under these conditions a flatter bottomed boat would probably have been bounced into the air before flying speed had been attained owing to the bows of the boat being lifted on striking a swell. With the 'Iris' this was not the case. The bows cut through the swell and any tendency of the bows to be lifted by the swell could easily be counteracted by the elevator. This feature is considered to be of very great advantage.

"It is suggested that the take-off of the 'Iris' might be improved by making the V a little flatter and by rounding off the keel in the neighbourhood of the step, but that the sharp V should be retained for the forward part of the hull in order to retain the good qualities when taking-off in a swell.

"When flying with one engine throttled right back, it was found necessary to hold the rudder hard over to keep straight, and even then, at an air speed of less than 65 knots, the rudder control was not sufficient to prevent turning towards the throttled engine. It is considered that in the design of twin- and multi-engined aircraft, some provision should be made for flying with one engine stopped.

"An adjustable tail fin is suggested, or an extra rudder operated independently of the rudder bar. Without some such provision the only chance of flying with one engine stopped is when the air is quite calm, as with the rudder hard over, there is no rudder control left in one direction to counteract bumps. An adjustable tail fin would also be very useful for normal flying as nearly all multi-engined aircraft have a tendency to turn in one direction or the other. This involves either a constant pressure on the rudder bar which, though slight, may be very tiring on a long flight, or throttling down one engine.

"It was found on the 'Iris' that the port engine had to be run at about 50 r.p.m. less than the starboard in order to keep straight without any rudder. The fore and aft trimming gear of the 'Iris' is considered to be very good. From the design point of view it seems to be much simpler than the adjustable tail plane, and it is very effective. The loss of trim caused by one man moving from the pilots' cockpit to the cockpit behind the rudders was counteracted by moving the elevator lever through about one-third of its range.

"Engines

"Apart from the troubles mentioned, the 'Condor' engines ran very well indeed and gave no anxiety.

"The defective starboard engine was returned to Karachi and details of the internal failure are not available, but it seems almost certain that the failure was due to the strain of running for about two hours with six cylinders cut out.

"The cause of the fracture of the camshaft drive housing was not apparent, but there have been other failures of the same part and I understand that the design has now been modified.



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Navigation

"For the greater part of the cruise land was in sight and the air pilotage presented no difficulties. The only long sea crossings without sighting land were from Cape Sidero (Crete) to Aboukir, 300 sea miles; from Aboukir to Farnagusta (Cyprus), 300 sea miles; and from Bengazi to Malta, 350 sea miles. Cape Sidero lies on the direct line from Athens to Aboukir, and the drift was checked when approaching this point.

"In order to check drift when approaching a point, a vertical wire was fitted near the middle of the pilots' windscreen and a vertical line was marked on the inside of the front cockpit so that a line joining this mark and the vertical wire was parallel to the fore and aft axis of the aircraft. Other marks were made every 5° up to 20° to port and starboard.

"The drift was found by trial and error. For instance, suppose the drift was thought to be 10° to starboard, then the aircraft was turned till the point being approached coincided with the starboard 10° mark in the front cockpit when sighted from the vertical wire. The compass was set in this position and the same course steered for a few minutes.

"If, after this time, the point of land was still on the 10° mark, it was clear that the drift had been correctly estimated. If the angle had increased, then it showed that too much was being allowed for drift, and *vice versa*.

"When the drift had been determined in this way, and the appropriate correction had been made on the compass, the same compass course was maintained after having passed directly over the point of land. Back bearings were then taken on the point by means of the 0-3 compass, and the compass course altered again if necessary until a constant back bearing of the required magnetic track + or - 180° was observed. When out of sight of land the drift was checked at intervals by means of cartons containing aluminium dust. One of these was thrown overboard and a back bearing taken on the mark made by the aluminium dust on the surface of the water.

"This method was found to be quite satisfactory, except when the surface of the sea was covered with white crests, when it was difficult to distinguish the mark made by the aluminium dust from the white crests. The appearance of the two from the air is very similar. On one occasion a carton was dropped from 4,000 ft., but owing to its lightness and consequent slow rate of fall, it was too far behind when it reached the water.

"It was found in practice that about 1,500 ft. was the maximum height for good results. Theoretically, to get accurate results by this method, the carton should strike the water directly underneath the aircraft, hence, the greater the height the less accurate is the result. During this process the aircraft must be kept on a very steady course. Hence, when the air is bumpy, the results are not so reliable.

"Back bearings were taken from one of the two side ports in the hull just aft of the trailing edge. The compass standard was screwed to an angle bracket which fitted the standard drift plate fitting. These fittings were riveted to the outside of the hull, just below the middle of the side ports. This position was found to be very convenient.

"During the flight from Bengazi to Malta, D.F. bearings were sent from Malta every half an hour. The first three D.F. bearings were second class and indicated that the aircraft was slightly to the eastward of the correct track. The fourth bearing, received 2 hrs. 15 mins. after leaving Bengazi, was first class, and showed that the aircraft was exactly on the line joining Bengazi and Malta. One hour after this the bearing had altered 1 deg. Shortly after this the wind (which was on the port beam) increased in strength, and a back bearing on the aluminium dust showed that the drift had increased from 11° to 16°, and the compass course was altered accordingly.

"Four and a half hours after leaving (*i.e.*, 45 mins. before landing at Malta) a D.F. bearing showed that the aircraft had drifted to leeward of the correct track and the compass course was altered 10°. Half an hour later Malta was sighted.

Conclusion

"In conclusion, I should like to express my gratitude for the kindness and help we received wherever we went.

"All possible assistance was given at the foreign seaplane stations we visited, and I should like specially to mention the Italians who went to a lot of trouble in sending us particulars and photographs showing exactly where we had to land at Naples. When we left Naples the Italians put up a very good escort consisting of three single-engined flying-boats.

"Our greatest thanks are due to the Navy, as represented by H.M.S. 'Crocus', for the invaluable assistance they gave us at Henjam and Jask.

"Finally, I should like to express my regret for the inconvenience our passengers were sometimes called upon to put up with, and to thank them for the sporting spirit which they showed when things happened not quite according to programme."

SUMMARY OF FLYING TIMES AND DISTANCES

Date.	Local Time.	From	To	Distance (Sea Miles)	Flying Time.		Average G.S. knots.
					h.	m.	
Sep. 27	10.55	Felixstowe..	Plymouth ..	285	3	15	88
" 29	06.55	Plymouth ..	Hourtin ..	385	5	50	66
" 29	14.40	Hourtin ..	Berre ..	325	4	5	80
" 30	10.45	Berre ..	Naples ..	460	5	15	88
Oct. 1	09.30	Naples ..	Athens ..	515	5	55	87
" 2	09.55	Athens ..	Aboukir ..	510	5	50	87
" 8	08.00	Aboukir ..	Alexandretta	440	5	50	75
" 11	06.40	Alexandretta	Habbaniya	445	4	55	90
" 11	16.45	Habbaniya	Hinaiidi ..	60	0	40	90
" 12	07.00	Hinaiidi ..	Basra ..	270	2	50	95
" 13	06.25	Basra ..	Henjam ..	525	6	15	84
" 14	09.45	Henjam ..	Jask* ..	120	1	50	65
" 15	06.10	Jask ..	Karachi ..	510	6	40	77
Total				4,850	59	10	82

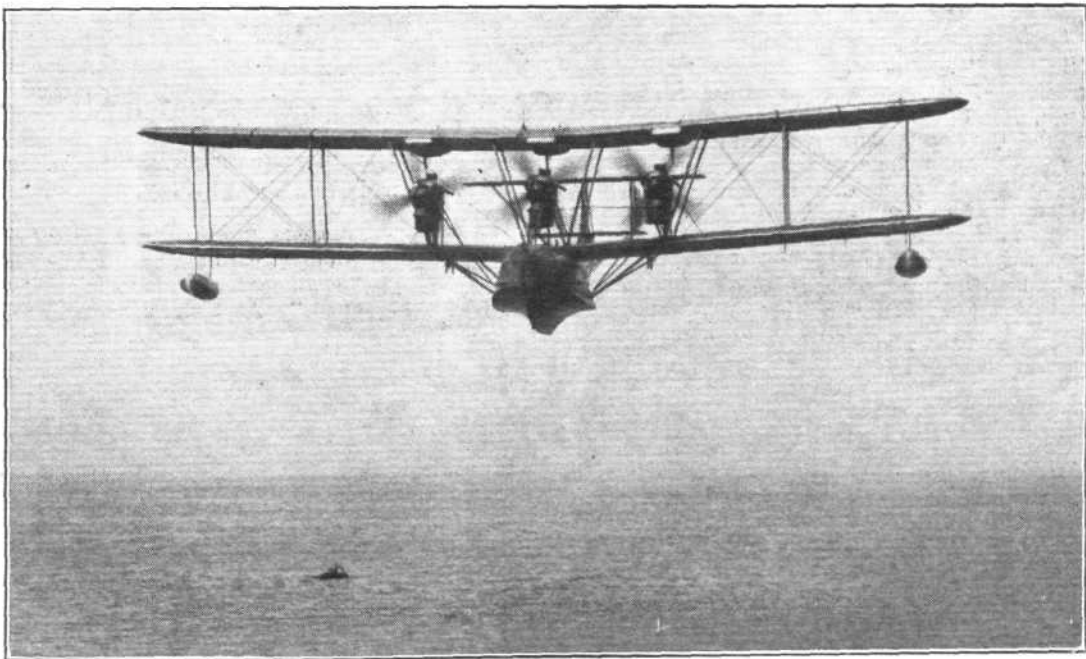
* Forced landing.

Homeward

Oct. 24	06.55	Karachi ..	Gwadar ..	255	3	15	78
" 24	12.30	Gwadar ..	Jask† ..	253	3	20	76
Nov. 1	08.07	Jask ..	Henjam ..	120	1	30	80
" 1	11.30	Henjam ..	Abadan ..	495	5	30	90
" 2	14.10	Abadan ..	Basra ..	30	0	20	90
" 3	09.50	Basra ..	Zeidan‡ ..	260	3	0	87
" 4	11.40	Hinaiidi ..	Habbaniya	60	0	50	72
" 5	07.00	Habbaniya	Alexandretta	445	6	20	70
" 6	06.35	Alexandretta	Aboukir ..	440	5	45	76
" 7	07.00	Aboukir ..	Sollum ..	250	3	55	64
" 7	13.00	Sollum ..	Bengazi ..	310	4	30	69
" 8	07.45	Bengazi ..	Malta ..	350	5	15	67
" 10	13.00	Malta ..	Naples ..	325	3	55	83
" 11	06.30	Naples ..	Berre ..	460	5	45	80
" 12	09.30	Berre ..	Hourtin ..	325	4	30	72
" 13	07.45	Hourtin ..	Calshot ..	485	6	15	77
" 14	09.25	Calshot ..	Felixstowe..	160	2	0	80
Total				5,023	65	55	76

† Forced landing; 7 days' at Jask—starboard engine changed. ‡ Forced landing—taxied to Hinaiidi.

Total distance out and back, 9,873 sea miles: Total flying time out and back, 125 hrs. 5 mins.: Average ground speed out and back, 79 knots.



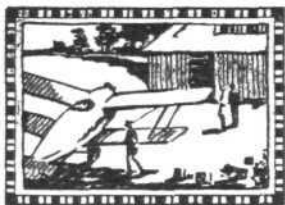
The Blackburn "Iris" metal flying-boat, three Rolls Royce "Condor" engines

Greek Air Ports

As the result of the conference between the Greek air authorities and the Italian expert who was sent to discuss the matter, complete agreement has been reached for the

installation of airports on reciprocal terms at Phaleron, Navarino and Corfu. General Balbo, the Italian Under-Secretary for Air, who has been at Athens in connection with the London—India air service, left at noon on May 4 for Italy.

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FLYING

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LONDON-SOUTH AFRICA ON AN EXPERIMENTAL LIGHT 'PLANE

Sqdn.-Ldr. L. H. Slatter's Flight

HAVING four months' leave at his disposal during the spring of this year, Sqdn.-Ldr. L. H. Slatter, O.B.E., D.S.C., D.F.C., R.A.F., well-known as the senior officer of the R.A.F. High-Speed Flight which won the Schneider Trophy for England in 1927, decided towards the end of last year, to make good use of it by paying a visit to South Africa, where he was born; his present home is in Richmond, Natal. From his long association with aviation it was only natural that he should wish to carry out the journey by air, and in order to do so as economically as possible, he decided on the light aeroplane as the most suitable class of machine. Sqdn.-Ldr. Slatter was immediately attracted to the new Blackburn metal "Bluebird," which, at that time, was in the very early stages of construction, and he accordingly approached the directors of the Blackburn Company for one of these machines. In spite of there being little or no prospect of carrying out complete experimental trials on the type before the proposed date of his departure, such was the confidence of the directors in their new production, and in Sqdn.-Ldr. Slatter's excellent capabilities as a pilot, that they decided to grant his request. Sqdn.-Ldr. Slatter gratefully accepted their decision and thereupon set to work on his preliminary arrangements. At the outset it was definitely decided that there should be no question of attempting a record, but that the flight should just take the form of a leisurely holiday trip, allowing Sqdn.-Ldr. Slatter to cover the distance as he wished, stopping when and where he felt disposed and for as long as he liked.

The Start

On February 22, the first metal "Bluebird IV" with a De Havilland "Gipsy" engine was completed, and on February 23 was flown for the first time at the Blackburn Works at Brough, East Yorkshire. From the moment of leaving the ground the excellent behaviour of the machine showed that everybody's confidence was fully justified. As originally conjectured, full experimental trials could not possibly be completed before Sqdn.-Ldr. Slatter's departure. However, during the week which remained, every opportunity was taken to fly the machine, and on March 3, the first "Bluebird IV" as originally produced, with the exception of one or two minor modifications, left Brough for Croydon.

Although this new all-metal Blackburn "Bluebird" with D.H. "Gipsy" engine had not completed full experimental trials, Sqdn.-Ldr. L. H. Slatter flew it from London to South Africa in five weeks with scarcely any hitch.

On reaching the south, Sqdn.-Ldr. Slatter found Capt. Drew and Mrs. Hylton Cleaver preparing to set out to India in a "Gipsy-Moth," and by mutual arrangement both machines started on their long journey from Croydon on March 8. On the first day they reached Paris, where they lunched, and on leaving in the afternoon had a tremendous send-off, Mrs. Janis (mother of Elsie Janis, the famous actress) pouring champagne over the "Bluebird" for luck. The same afternoon they went on to Lyons and spent the night there. At that time the weather was very cold and the efficiency and benefit of the cockpit heating system of the "Bluebird" proved a boon to Sqdn.-Ldr. Slatter. On March 9, they went on to Marseilles and landed for lunch, intending to continue to Pisa the same day, but eventually decided to stay the night at Marseilles.

During the next two days they encountered very strong head winds, but managed to get through to Pisa and Rome. At this stage the "Bluebird" developed a slight leak in the petrol tank, but this was successfully overcome temporarily by means of soap and other plastic substances, and the flight was continued. Catania, Sicily, was reached on March 13, and the next day they arrived at Tunis, this flight including a 90 miles' crossing over the sea.

At Tunis, Sqdn.-Ldr. Slatter had his petrol tank welded, and on March 17 arrived at Tripoli (400 miles in 5 hrs. flying time). During the very bumpy weather on this trip, Sqdn.-Ldr. Slatter reports that the "Bluebird" behaved excellently, was easy to control and maintained true rigging.

Cairo-Durban

From Tripoli the "Bluebird" flew on to Benghazi and Sollum and eventually arrived at Aboukir on March 22. There Sqdn.-Ldr. Slatter had his machine overhauled preparatory to the long flight through Africa, and although the original petrol tank was quite satisfactory after the repair at Tunis, a new one sent out from England was fitted to prevent possibility of further trouble. After a week's stay at Aboukir he left on Good Friday, March 29, and went on to Cairo.

From Cairo onwards, Sqdn.-Ldr. Slatter evidently decided to push on a little more rapidly, and news of his progress was mostly confined to an occasional laconic cablegram, "Arrived—Everything good." At Cairo he wrote saying he would



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probably leave for Luxor on March 30. Evidently he did so and lost little time there and at Wadi Halfa, for the next cable announced his arrival at Khartoum on Easter Sunday, March 31. After leaving Khartoum on April 2, there was another shortage of news, but his arrival at Nairobi on April 5 showed that his progress *via* Malakal and Kisumu had been uneventful. Then came a letter written from Khartoum on March 31, describing his flight from Cairo; the first day he covered 670 miles in 7½ hrs. (a cruising speed for the trip of 89 m.p.h.) and the second day 525 miles in 6½ hrs.—1,195 miles in two days, a record for a light aeroplane in that part of the world. Over this trip he reported going through the most "mighty" bumps he ever felt and a ground temperature of 105° in the shade.

Reuter's agency next reported his arrival at Broken Hill, on April 10. Then came another period of silence until April 15 when came the good news by telegram, "Arrived Durban. Laugh that off. Congratulate Petty (the designer). My best always. Slatter." That marked the termination of the great flight, for Sqdn.-Ldr. Slatter proposes to remain at Durban for some little time, touring about the district, before finally going on to Capetown.

The successful conclusion of this long flight reflects very great credit on Sqdn.-Ldr. Slatter for his excellent achievement in piloting a small machine through all kinds of climate and weather, over all sorts of country—thickly populated districts, seas, rivers, lakes and deserts—and over such an extremely long distance; it also proves the capabilities of the metal "Bluebird" for hard service and satisfactory operation in extreme conditions, and is, moreover, probably the first time in history that the first experimental aeroplane

of a new type has, within a fortnight of completion, begun and succeeded in finishing a long distance flight of this description.

As was only to be expected, certain minor troubles developed on the trip and steps have been taken immediately to embody the necessary small modifications to the production type metal "Bluebirds." As an all-round test the flight has provided invaluable experience, it has proved the efficiency of the design as a whole, and ensured the production of a light aeroplane which can be operated with great efficiency on long distance flights.

Prices of New Metal "Bluebirds"

This new type "Bluebird," which was technically described and illustrated in *FLIGHT*, January 17, 1929, is quoted by the Blackburn Aeroplane Co., Ltd., at the following prices:—

"Bluebird IV":			
Land Machine	(Cirrus "Hermes" engine)	..	730
"	("Cirrus III" engine)	..	700
	(ex works ready for flight)		
"	(D.H. "Gipsy" engine)	..	710
"	(Armstrong-Siddeley "Genet" engine)	..	760
"Bluebird IV":			
Seaplane	(Cirrus "Hermes" engine)	..	990
"	("Cirrus III" engine) (ex works ready for flight)	..	960
"	(D.H. "Gipsy" engine)	..	970
"	(Armstrong-Siddeley "Genet" engine)	..	1,025

Toronto Flying Club

Skis were used by the Toronto Flying Club throughout the winter and the weather did not seriously cut down the average weekly flying time. This club, which did not start flying until May 1 last year, already claims to be the largest flying club in Canada. From that date until December 31, their 'planes flew a total of 1,225½ hours without, they report, one serious accident and no personal injuries. The log of the Club shows that 2,868 flights were made, 1,985 being passenger flights. Twelve students took private licences and ten others passed the commercial tests. The membership is 240 with an average of 95 actively taking instruction and 42 flying solo. The club used "Cirrus-Moths," and considering that the second and third machines did not reach them until June, and the fourth and last on September 11, their season was outstanding. A new "Gipsy-Moth" was received on March 9 and another was due last month. With the great strides made in the past half-year in flying generally in Canada, the Club is looking forward to doubling their flying time in 1929. R. Carter Guest is Chief Instructor, and Edward Burton is his assistant.

Heston Aerodrome

We are asked by Mr. F. A. I. Muntz, of Airwork, Ltd., to request pilots landing at Heston Air Park to land only in the north-eastern section, bounded on the south and west by a line of barrels and at the north-east by a temporary shed, above which flies a wind stocking. The reason for this is that the grass is as yet very young and tender, so the less taxi-ing the better. Pilots should leave their machines where they land and walk to the new buildings now being erected.

Cambridge Air Meeting

MARSHALL'S, Automobile Engineers, of Cambridge, inform us that an air meeting is being held at their Cambridge Aerodrome, on June 9. The proceeds from one enclosure will be set aside for the local hospital.

Airport for Kingston, Ont.

PREPARATORY work has begun towards the making of an airport for Kingston on the ground recently acquired by the Kingston Flying Club. Tenders have been called for the construction on hangars by the city's board of works. In addition to this work the Department of National Defence will install the necessary lighting.



Lady Heath has recently completed a flying tour of several American States on behalf of the American "Cirrus" engine. She flew a Cirrus-Avian and acted as her own pilot, mechanic, and saleswoman. About 3,000 miles were covered, and orders were lodged with her, we understand, for over 100 engines.

LIGHT PLANE CLUBS

London Aeroplane Club, Stag Lane, Edgware, Sec., H. E. Perrin, 3, Clifford Street, London, W.1.
Bristol and Wessex Aeroplane Club, Filton, Gloucester. Secretary, Major G. S. Cooper, The Aerodrome, Patchway, Glos.
Cinque Ports Flying Club, Lympne, Hythe, Hon. Secretary, R. Dallas Brett, 114, High Street, Hythe, Kent.
Hampshire Aero Club, Hamble, Southampton. Secretary, H. J. Harrington, Hamble, Southampton.
Lancashire Aero Club, Woodford, Lancs. Secretary, Mr. Atherton, Avro Aerodrome, Woodford.
Liverpool and District Aero Club, Hooton, Cheshire. Hon. Secretary, Capt. Ellis, Hooton Aerodrome.
Midland Aero Club, Castle Bromwich, Birmingham. Secretary, Maj. Gilbert Dennison, 22, Villa Road, Handsworth, Birmingham.

Newcastle-on-Tyne Aero Club, Cramlington, Northumberland. Secretary, John Bell, Cramlington Aerodrome, Northumberland.
Norfolk and Norwich Aero Club, Mousehold, Norwich. Secretary, G. McEwen, The Aerodrome, Mousehold, Norwich.
Nottingham Aero Club, Hucknall, Nottingham. Hon. Secretary, Cecil R. Sands, A.C.A., 30, Park Row, Nottingham.
The Scottish Flying Club, 101, St. Vincent Street, Glasgow. Secretary, George Baldwin, Moorpark Aerodrome, Renfrew.
Southern Aero Club, Shoreham, Sussex. Secretary, Miss N. B. Birkett, Shoreham Aerodrome, Sussex.
Suffolk Aeroplane Club, Ipswich. Secretary, Maj. P. L. Holmes, The Aerodrome, Hadleigh, Suffolk.
Yorkshire Aeroplane Club, Sherburn-in-Elmet, Yorks. Secretary, Lieut.-Col. Walker, The Aerodrome, Sherburn-in-Elmet.

LONDON AEROPLANE CLUB

(APRIL 29-MAY 5).—Instructors: Flt.-Lieut. H. G. Travers and Capt. F. R. Matthews. Ground engineers: C. Humphreys and A. E. Mitchell. Aircraft: The following machines were in commission—G-AABL, G-EBZC, G-AABN, and G-AAEX.

Total flying time for the week: 57 hrs. 30 mins.
 Dual instruction: 34 members received dual instruction, the time being 33 hrs. 20 mins.

Solo flying: 24 members flew solo, the time being 24 hrs. 10 mins.
 During the week, the following members qualified for their "A" licences:—Miss F. M. Wood, J. C. Barr, and J. W. Radbone.

Pilot instructor: Flight-Lieut. H. G. Travers took over his duties as Chief Pilot Instructor on Tuesday, April 30, and for the next 14 days we are also having the assistance of Capt. V. H. Baker, M.C., A.F.C.

Total flying for the month of April: Dual (221), 83 hrs. 55 mins. Solo (313), 112 hrs. 20 mins. Tests (98), 16 hrs. 30 mins. Passenger flights (75), 24 hrs. 55 mins. Total, 237 hrs. 40 mins.

BRISTOL & WESSEX AEROPLANE CLUB, LTD.

(APRIL 28-MAY 4).—Pilot Instructor: E. B. W. Bartlett. Ground Engineer: A. W. Webb. Machines in commission: (2), TV, YH. Flying time for the week: 17 hrs. 25 mins. Pupils instructed: (10), 11 hrs. 50 mins. Soloists instructed: (3), 1 hr. 15 mins. Licensed pilots flying: (4), 3 hrs. 30 mins. Test flights: (6), 30 mins. Passengers: (10), 2 hrs. 10 mins.

Some rather poisonous weather has curtailed our work severely this week. Mr. Seymour-Williams did his first solo on the 3rd, having made his first flight on April 16. We hope soon now to make the acquaintance of his friend, who promised to join as soon as this solo took place: Lady Bailey, from Stag Lane, and Capt. Bailey, from Cardiff, both visited us on the 4th, each in a coupé Gipsy Moth. Our official flying demonstration at Brockworth, on June 8, has unfortunately had to be cancelled, but in its place there will be an "At Home" at Sherborne Park, to which Lord and Lady Sherborne will invite their friends.

HAMPSHIRE AEROPLANE CLUB

(APRIL 27-MAY 3).—Pilot instructors: Flight-Lieut. F. A. Swoffer, M.B.E., and Mr. W. H. Dudley. Ground engineers: Mr. E. Lenny, and Mr. J. Elliott. Aircraft: D.H. 60 Moth, G-EBOL, Avro Avian G-EBVI, and Spartan G-AAFR. Flying time for the week: 47 hrs. 45 mins. Pupils under instruction (26), 26 hrs. 40 mins. Soloists: (6), 7 hrs. 5 mins. "A" pilots: (8), 7 hrs. 10 mins. Passengers: (7), 2 hrs. 5 mins. Instructors, solo and tests: (18), 4 hrs. 45 mins.

Messrs. Beadle, MacDonnell, Kabali and Wood have joined the Club this week. Messrs. Winn and Vernon achieved successful first solo flights, the latter after only 3 hrs. 50 mins. dual instruction.

On Friday, Mr. Burkett, of the Air Ministry, visited us in order to satisfy himself that we made no bogus claims in respect of grants. We are pleased to record that he expressed himself as being extremely satisfied with everything. Flight-Lieut. Swoffer took him for a joy ride before his departure.

Donations are still coming in for the suggested new aircraft, and it is hoped that those members who intend to subscribe will do so as soon as they can, so that the order may be placed as early as possible.

Flying time for the month ended April 30, 1929.—Total time for the month, 123 hrs. 15 mins. Dual, 61 hrs. 30 mins. Solo, 6 hrs. 50 mins. "A" pilots, 36 hrs. 40 mins. Instructors, solo and passengers, 18 hrs. 15 mins.

LANCASHIRE AERO CLUB

(APR. 21-27).—Flying time: 34 hrs. 15 mins. Instruction: (14), 10 hrs. 45 mins. Solo flights: (19), 14 hrs. 30 mins. Passenger flights: (11), 7 hrs.; Tests: (14), 2 hrs.

Instruction (with Mr. Hall): Stern, Paddock, Greg, Ashworth, J. H., Goss, Collins, Faulkner, Kay, Foote, Barlow, Gerrard, Ashworth, W., Patteux, Garner. Machines in commission: MQ, EC, QL, XD.

Soloists (under instruction): Williamson, Goss, Stern, Collins, Sellers. Pilots: Weale, Davies, R. G., Tweedale, Michelson, Lacayo, Garner, Kay, Fallon, Meads, Nelson, D., Harrison, Mills, Cohen.

Passengers (with Mr. Hall, R.F.): Garner, Miss Harrison, Brown, Miss Russell, Chadwick; (with Mr. Nelson, D.): Scholes, J. J.; (with Mr. Lacayo): Miss Dyson, Kay; (with Mr. Michelson): Miss Wilkes; (with Mr. Mills): Fallon, Emery.

First solos were carried out by Messrs. Collins and Paddock. Mr. Collins has created a record so far as this club is concerned by learning to fly *ab initio* and passing all tests for his "A" licence in 12 days. The weather during the period has been rather stormy and it was a performance which reflected great credit on both pupil and instructor.

On Friday the Chairman of the Club left with Mr. H. A. Brown on Avian G-AAGP to fly to Madrid.

LIVERPOOL & DISTRICT AERO CLUB

(APRIL 28-MAY 4).—Total flying time: 29 hrs. Pupils, solo (19), 16 hrs. 5 mins. Pupils, dual (5), 4 hrs. 10 mins. "A" pilots (8), 5 hrs. 50 mins. Passenger flights (6), 1 hr. 40 mins. Test flights (14), 1 hr. 15 mins.

New pupils under instruction: Messrs. R. W. Anderson, D. W. Bond. Congratulations to our "Sky Pilot," the Rev. Woosnam Jones, who put up an excellent first solo.

Capt. Marstrand enlivened the proceedings on Tuesday evening by attempt-

ing his height test. A Mk. III undercarriage was not "up to" his landing—however, the machine was due for C. of A., anyway.

The clubhouse is now open daily from midday to dark, nevertheless, a certain member has been tee-total for a month. The bet must be a substantial one!

MIDLAND AERO CLUB

(APRIL 28-MAY 4).—The total flying time was 24 hrs. 24 mins. Dual: 11 hrs. 25 mins. Solo: 7 hrs. Passenger: 5 hrs. 10 mins. Test: 49 mins. The following members were given dual instruction by Flight-Lieut. T. Rose, D.F.C., and Mr. W. H. Sutcliffe:—R. G. Welch, M. Blakeway, F. G. Robinson, K. S. Neale, E. Skuce, Dr. W. G. Tilleke, P. B. Hackett, J. Wingate, T. G. Ellison, C. T. Davis, H. M. Goodwin, H. A. Taylor, G. P. Haylock, A. E. Colman.

Advanced dual:—E. P. Lane, W. L. Handley, H. J. Willis, J. Cobb, E. D. Wynn.

"A" Pilots:—E. R. King, E. P. Lane, R. G. Cazalet, M. C. Wilks, C. W. Fellows, W. M. Morris, J. Cobb, W. L. Handley, J. K. Morton, J. Rowley, G. C. Jones, S. H. Smith, G. V. Perry, R. L. Brinton, R. D. Brinton.

Soloists:—M. Blakeway, P. B. Hackett, G. P. Haylock.

Passengers:—S. James, Mrs. E. R. King, R. L. Jackson, C. W. Fellows, Miss R. Toppin.

On Thursday, Mr. G. P. Haylock was launched solo, and put up a good performance.

NEWCASTLE-UPON-TYNE AERO CLUB

(APRIL 22-28).—Instructor: G. M. S. Kemp. Engineer: K. C. Brown; Assistant, J. Tait. Aircraft: (3), PT, LX, QV. Flying time, 6 hrs. 45 min. Instruction, 4 hrs. 45 min. "A" pilots: 1 hr. 30 min. Passengers: 10 mins. Tests: 20 min.

On Tuesday, Mr. Hope, of Air Taxis, arrived in the Fokker to pick up three passengers and take them back to town.

Messrs. Wright and Storey, of the Cinque Ports Club, arrived on Saturday, en route for Scotland.

Sunday morning saw the arrival of the Hon. Douglas Hamilton on the Marquess of Douglas and Clydesdale's machine. Owing to the very bad weather, they were obliged to stay at Cramlington.

Late in the afternoon, Sir Alan Cobham landed in the storm, on his way to Scotland. He kept the members entertained by relating some of his experiences.

NORFOLK & NORWICH AERO CLUB

(APRIL 29-MAY 5).—Flying time: 12 hrs. Instruction: E. T. Green, W. Piekthorne, C. Coates, A. Marshall, C. Neave, C. Browne, E. Lambert. Solo: L. W. Lowen, J. Collier, W. Cubitt, R. T. Harmer, E. C. Lambert, N. A. Brett, W. Lindley, J. Kirkby.

We regret the absence of reports in this paper for many weeks. This has unfortunately been unavoidable. Mr. McEwen, our Club Secretary, was taken seriously ill some six weeks ago, and as he had charge of the office during the last 12 months, when a rapid advance in the club was made, it can be imagined what disorganisation was created in the office. By the aid of voluntary help, which is always very keen but often uncertain, we have managed to get things right in the office. Almost when we were running in order again, our Instructor, Capt. J. C. Houston, who had so excellently rebuilt our Flying side, was stricken with flu, and the result has been almost a cessation of Club activities.

We now regret to report that Capt. Houston is leaving us. Although we only recently signed a contract for some considerable time with him, he has had a splendid offer made him from another source, with the result that the Management Committee felt they could not possibly stand in his way. Under these circumstances, we are asking members who read this excellent journal to bear with us for a short time longer while we make other arrangements.

The arrangements for the Whitsun Display are well in hand. We, however, require many voluntary helpers for the Whit Monday.

"A" Licence pilots can fly at any time, as we have three machines, all in splendid trim at the moment.

Membership.—Membership fees were due for renewal on the 1st inst., and we shall be pleased to receive these at an early date. As from this date an entrance fee will be charged, active members, £3 3s.; associate, £1 1s. This is in accordance with the Articles of the Club.

On Thursday last, Mr. L. W. Lowen created a Club record by attaining a height of 12,000 ft. in our original "Moth" QX.

A landing competition has been arranged for Thursday next.

THE NORTHAMPTONSHIRE AERO CLUB

(APRIL 21-27).—Instructor: James Bunning. Ground engineer: J. Gallaher. Aircraft: (1), RX. Flying time: 5 hrs. 20 mins.

RX still out of commission up to Friday evening, consequently we have had only one flying day this week during which we put in 5 hrs. dual instruction and 20 mins. solo, the latter by Mr. Tyzack.

SOUTHERN AERO CLUB

(APRIL 22-28).—A fairly quiet and uneventful week, with a busy weekend, during which a number of pupils came out for dual instruction. Some passengers were also taken up for flights on Sunday, in the Avro G-1BYB.

A AND P TUBES OF COURSE !



THE chassis members, the engine-carrying nose, and other of the vital tubular parts of the Fairey Long Range Monoplane (Napier Engine), are made from A and P Tubes, and the wonderful achievement of this machine adds another to the long list of A and P-assisted air records

One of our Aircraft customers said to us the other day: "It's wonderful, the way you solve problems of tubular manipulation"

We have been making and manipulating steel tubes for aircraft since 1908, and probably have had more experience of the requirements than any other firm in the world. Many a difficult constructional problem has been solved in our aircraft tube workshops.

The strength of a flying machine depends, to a large extent, on the tubular construction, on which falls the greater portion of the strain of rising—that critical un-air-borne run at starting—and the shocks of landing.

We specialise in tube work for Aircraft. Fatigue tests are being carried through in our Works every day and all day, and by this means our knowledge of the properties and possibilities of every suitable grade of steel on the market is kept right up to date, for the benefit of aircraft designers and builders.

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"Flight" photograph

SOLE LICENSEES AND MANUFACTURERS
OF GLOSTER-HELE-SHAW VARIABLE
PITCH PROPELLER

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YORKSHIRE AEROPLANE CLUB

(APRIL 28-MAY 4).—Pilot instructor: Flt.-Lt. H. V. Worrall. Ground engineer: R. Morris. Assistant ground engineer: G. Speight. Machines in commission: 2 (BD and SV).

Flying time for week: 27 hrs. 45 mins. Instruction (14), 11 hrs. 25 mins. Soloists (5), 6 hrs. 25 mins. "A" Pilots (8), 8 hrs. 35 mins. "B" Pilots (1), 45 mins. Passengers (3), 30 mins. Test flights (1), 5 mins.

Mr. R. Fields and Mr. Gill successfully completed their tests for their "A" licence. Mr. Bamford, our youngest member, gave a very creditable performance on his first solo.

FROM THE FLYING SCHOOLS

Brooklands School of Flying, Brooklands Aerodrome

(APR. 22-28).—Instructors for the week: Captain H. D. Davis, A.F.C., Captain E. A. Jones, Major C. M. Pickthorn, M.C., J. M. Oliver. Total flying time for the week, 47 hrs.

Mr. Shiu Kau Lee, one of our Chinese pupils, has completed all his tests and examinations for his "A" licence.

Captain Blackmore hired one of our machines for a flight to Rotterdam last week and force-landed on the return journey at the bottom of Reigate Hill, owing to shortage of petrol. Capt. Davis had to collect the machine the following day and had an unpleasant experience of taking the machine out of a small field side-wind and flying it back to Brooklands with a visibility of, roughly, 200 yards. The following new pupils are welcomed to the school: Messrs. Rigg, Bridgewater, Rivera.

One of our old pupils, Mr. J. C. Lattey, returned on Sunday and put up a good show on an Avro and Moth.

On Sunday last, Flight-Lieut. (Tiny) Scholfield gave a wonderful exhibition of "Double bunting" and upside-down flying on Mrs. Scott's machine.

Henderson Flying School, Croydon Aerodrome

(APRIL 23-29).—School work has been going on as usual, only rather more so. G-EBVK has been replaced by U2, and pressure of work has made it necessary to buy another Moth, G-EBT1.

As most of the pupils seem to prefer to remain anonymous, mention of names is difficult, but there are now 21 pupils under instruction, many of whom are ready for solo, and some of whom have already flown alone.

The chief event of the week was the testing of two original types of monoplane by Col. Henderson, at Brooklands.

After the first flight of the multi-seater, it became impossible to cope with the rush of passengers, who, despite the warning that the machine was new and experimental, insisted on being taken up, about 50 being initiated to the delights of "pushing." Everyone was delighted with the feeling of security and comfort. The motor-cycle of the air proved itself on its first flight.

North Sea Aerial and General Transport, Ltd., Brough Flying School

(APRIL 21-27).—Our total flying time for this week is only 5 mins. short of 60 hrs., good weather having made flying possible every day. Flight-Lieut. Travers and Flying Officers Messenger, Cudemore, Greenough, Rolfe, and Brownlee received 11 hrs. 5 mins. dual on "Darts" from Messrs. A. G. Loton and J. B. Stockbridge, and carried out 24 hrs. 20 mins. solo.

Flying Officer Messenger left on Tuesday, Flight-Lieut. Travers on Friday, and Flying Officer Cudemore on Saturday, the first two having completed three quarters' training each, and the last named two quarters.

Pilot Officers Stanley, Clarke and Walker and Messrs. Hall and Ellis received 10 hrs. 50 mins. dual on "Bluebirds."

On the seaplane school, Flying Officers Petter and Campbell received 55 mins. dual from Flight-Lieut. N. H. Woodhead, and carried out 16 hrs. 15 mins. solo. Test flights occupied another 20 mins. Flying Officer Petter left on Saturday, having completed four quarters' training.

We were visited on Friday by Col. I. A. E. Edwards, Sir Alan Cobham, and Capt. and Mrs. Stack. Col. Edwards was taken over to Sherburn by Flight-Lieut. Woodhead in one of the school "Bluebirds."

On Saturday morning, Sir Alan Cobham, accompanied by Capt. Blackburn, made an aerial survey of the district to choose a site for an aerodrome, which he will use on his visit to Hull, in May or June. Several prospective sites were inspected, and Sir Alan Cobham finally chose the Beverley Racecourse as the best available site for the purpose.

Phillips and Powis School of Flying, Reading Aerodrome

(APR. 21-27).—Total flying time for the week: 16 hrs. 5 mins. Instruction (under F./O. R. T. Shepherd): 14 hrs. 15 mins. Passenger flights: 1 hr. 50 mins.

Three pupils launched solo successfully in the school's third week of flying and is worthy of record.

Mr. B. L. Hieatt (who, by the way, is entered in all three T.T. races in the Isle of Man this year) was observed making a quite good loop, solo, on his next flight after being "launched." Such spirit calls for admiration, though not (our pupils are asked to note) emulation. (School rules should be consulted on the subject).

The school has just had the honour of a flying visit from Squadron-Ldr. The Rt. Hon. F. E. Guest, P.C., D.S.O., M.P., with Squadron-Ldr. Soden and Mr. Fielden, on Moths. The laudatory remarks regarding the unique position, size, approaches and surface of the aerodrome made by these distinguished visitors are a source of satisfaction to the proprietors, and should be an encouragement to all intending pupils and users of Reading Aerodrome.

(APRIL 28-MAY 4).—Total flying time for week (mainly instruction): 9 hrs. 25 mins.

Winds, high; flying time, low! The following new pupils have joined the school this week:—Mrs. Moore, Mrs. Powis, Messrs. Ruffell, and G. W. G. Allen.

The following new "bird" has been hatched out: 504k Avro G-AAGG. It has successfully tried its wings.

Surrey Flying Services School of Flying, Croydon Aerodrome

(APR. 23-29).—Instructor: J. J. Flynn. Ground engineers: F. Kent and R. Fox. Aircraft: AABW; EBVA. Flying time: 26 hrs. 40 mins. Passengers: 800.

Most of our flying during the week has been devoted to joy-riding, but we managed to get in a fair amount of school work. Messrs. Lane and Fox have both been solo, and very fine shows were made by both pupils, flying and landings being perfect. A number of new pupils have joined the school, and we regret to report that Mr. Nils Mark, has had to return to Sweden on business, which was most unfortunate as he had already been solo, and was a fine pilot.

Mr. Rogers again pushed off on the Avian on a business tour and visited Lincoln, Bedford, Bournemouth and Teignmouth; he is shaping exceptionally well, and should soon be able to obtain his "B" licence.

The new four-seater Avro G-AAGB is doing good work, and is a great improvement on the standard and five-seater Avros. The D.H.9 is well on the way now, and will be ready before very long.

In additions to our operations at Croydon we had aircraft flying at Worcester Park and Dartford.



["FLIGHT" Photographs]

THE "MOTOR-CYCLE OF THE AIR": Two views of a new light monoplane which has just been produced by Lieut.-Col. G. L. P. Henderson (of the Henderson Flying School, Croydon). Designed by Capt. K. N. Pearson, this little machine is powered with a 40 h.p. A.B.C. "Scorpion" engine, and is of all-wood construction—even to the fuselage and wing covering. It is intended to place this machine on the market at a very moderate price.

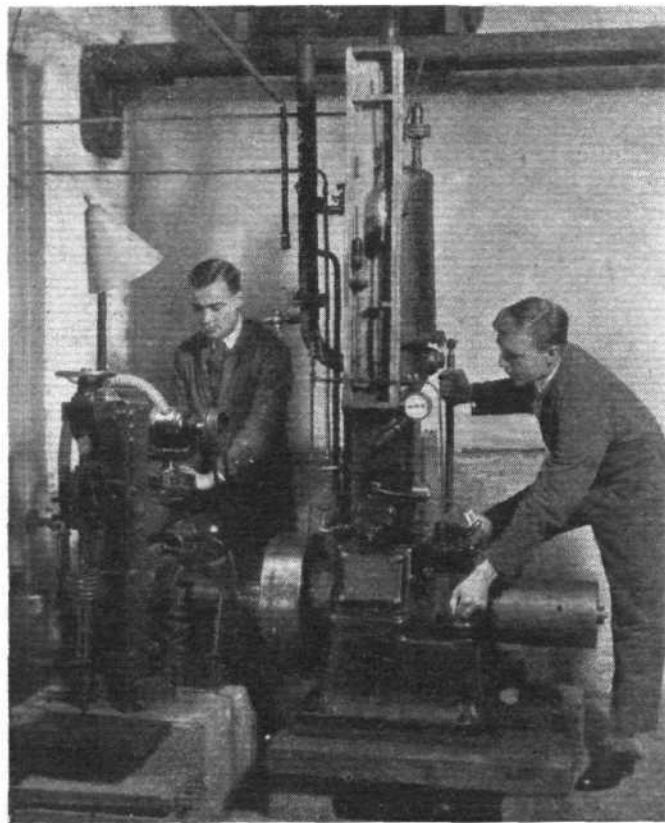
AIRISMS FROM THE FOUR WINDS.

The King's Sympathy

THE following message has been sent by the King through Mr. L. S. Amery, Secretary of State for the Dominions:—"I am commanded by His Majesty to convey an expression of his deep regret at the news of the tragic deaths of Lieutenant Keith Anderson and Mr. Hitchcock, resulting from the forced landing of the aeroplane *Kookaburra*. His Majesty desires the relatives of the airmen to be informed of his sincere sympathy in their sad loss." The Australian Government has arranged for an overland party to return to the *Kookaburra*, to recover the airmen's bodies. They will be buried according to the wishes of the relatives, with suitable ceremony. A memorial will be placed over their graves. An advanced water base is being established and camels are being employed to assist in the transport. Aeroplanes will escort the land party.

Flight to Australia Resumed

THE attempt to fly from England to Australia in the Vickers "Vellore" (Jaguar engine), which started on March 18 and was delayed in North Africa, has now been resumed from Cairo. A new wing and undercarriage were sent out to North Africa, and the machine was transported to Cairo. On May 1 it left Cairo, piloted, as before, by Flight-Lieut. J. Moir and Flying Officer H. Owen, two Australian airmen. Baghdad was reached the same day after a non-stop flight. On May 2 they flew to Bushire, and from Bushire to Bander Abbas on May 3. Karachi was the next stage on May 4. Fierce sand-storms and strong head winds were encountered



TECHNICAL RESEARCH AT "KING'S": In view of the fact that heavy-oil engines will be used on the new airship R.101, the above picture is of interest in that it shows two research students—D. B. Foster and A. Ivanoff—of the Mechanical Engineering Department, King's College, London, experimenting on a Diesel engine. "King's"—which is this year celebrating its Centenary, and has launched an appeal for funds to improve College buildings, provide scholarships, etc.—has a magnificent record in the world of scientific and mechanical research.

all down that stage along the Persian Gulf, and the pilots spent May 5 cleaning the machine of the sand. A non-stop flight of 10 hours on May 6 took them to Allahabad.

Solo Tour of Australia

CAPT. GROSVENOR, Aide-de-Camp to the Governor of South Australia, left Parafield Aerodrome at dawn on May 6 on the first stage of a solo flight round Australia, reaching Melbourne in 4 hours 20 minutes. The tour is expected to occupy three weeks. Capt. Grosvenor is the owner of a Cirrus-Moth, but whether he is using this machine for the tour is not stated.

Fairey Monoplane to Fly Back

THE Fairey monoplane fitted with Napier "Lion" aero-engine, which flew non-stop from Cranwell to India on April 24-26, piloted by Sqdn.-Ldr. A. G. Jones-Williams and Flight-Lieut. N. H. Jenkins, will return to England by easy stages. When this will be is not decided yet.

Dutch Seaplane Crashes on the Tigris

A DUTCH seaplane, D.22, which arrived at Baghdad with two others from Alexandria on April 29 on their way to Batavia, crashed into a bridge on the Tigris while landing, after fouling some telegraph wires. The pilot, Lieut. Everts, was killed, and the rest of the crew were badly shaken.

Another Atlantic Flight Planned

THE full moon period between May 20 and May 31 next has been selected for an attempt on an Atlantic flight. This statement was made by M. Armand Lotti, Jr., the backer of the flight, who embarked on the United States liner *President Roosevelt* at Cherbourg recently en route to New York to supervise final preparations. He was accompanied by Jean Assolant, a well-known French pilot, who will pilot the *L'Oiseau Canari* during the flight. This monoplane, which has been so named on account of its bright yellow colour, was shipped to the United States on the *Leviathan* three weeks ago, and is at present being mounted and assembled at Mitchell Field. It is under the care of René Lefevre, who will accompany Jean Assolant as navigator. New York to Le Bourget will be the objective of the fliers. M. Lotti states that the course will probably be plotted along the northern route followed by Col. Lindbergh. *L'Oiseau Canari* is a Bernard monoplane equipped with Hispano-Suiza engines, and is specially built for long distance flights.

Indian Air Mail

THE first unofficial passengers to travel by the London to India air mail service left Croydon on Saturday, May 4. One of the passengers booked through for Bushire, while two others, one of them a woman, are flying to Suda Bay, Crete. The air liner carried 14,000 letters, compared with about 10,000 the week before.

Graf Zeppelin's Cruises

THE airship *Graf Zeppelin* left Friedrichshafen at 5.10 a.m. on May 2 and flew over Vienna and other places in Austria. It then returned and landed at Friedrichshafen at 6.45 in the evening. Bricquets attached to parachutes were dropped over Vienna, and a speech by Dr. Eckener from the dirigible was broadcast, in which he referred to the common aspirations of Austria and Germany.

Glider News

AN agreement has been signed between the Rhoen Rositten Glider Co. and the American Motorless Aviation Corporation with the object of improving gliding on the basis of Germany's experiences over 10 years. Two young Darmstadt pilots, Herr Knodt and Herr von Chlingensperg, have already left for the United States to organise a glider school at Cape Cod.

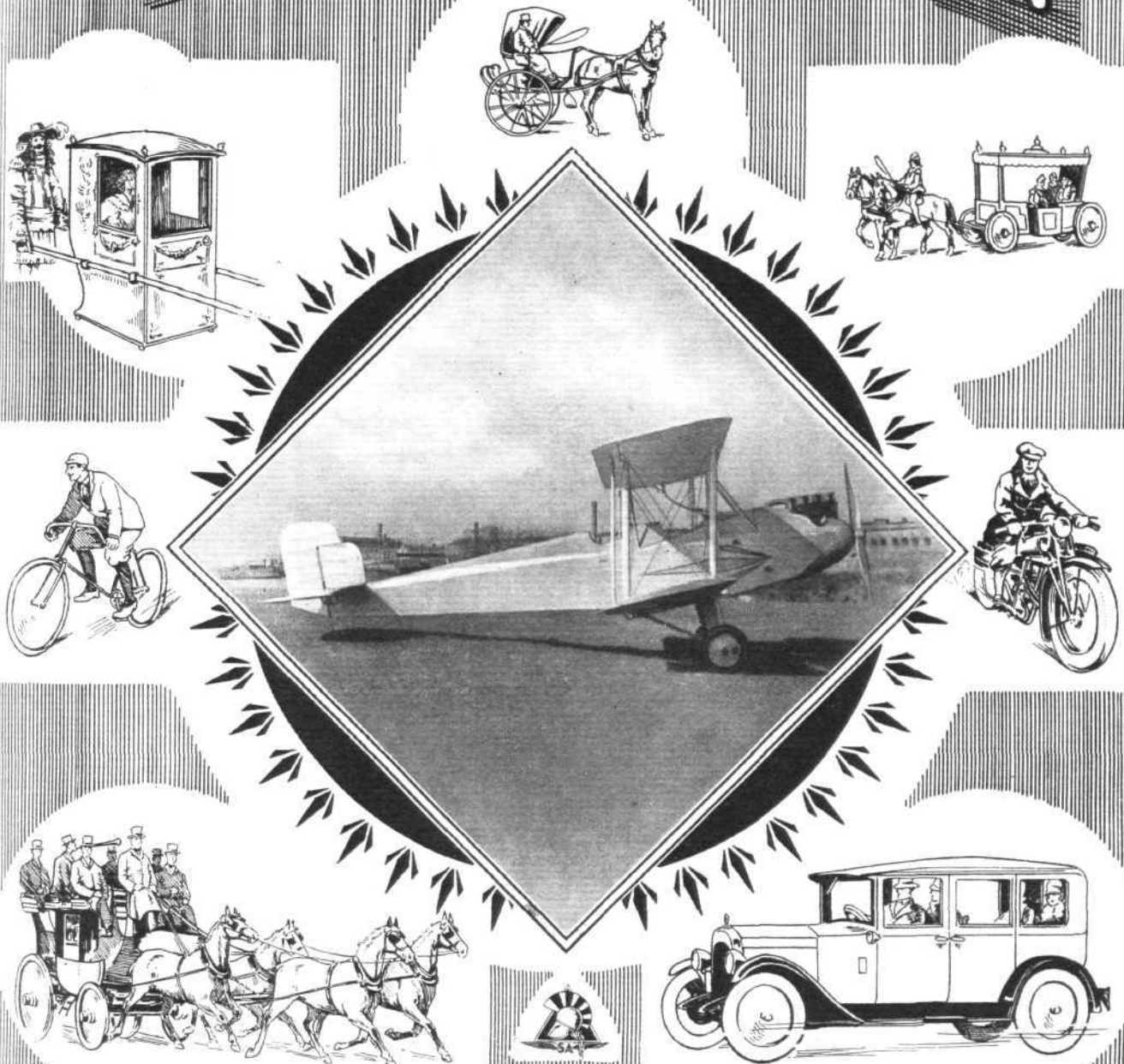
Italy-Egypt Air Service

THE first homeward-bound aeroplane on the new Italian air mail service between Italy and Egypt left Alexandria for Genoa on Saturday.

Italian Air Lines

THE Italian air line Vienna-Venice-Rome, has been extended since April 21, by a line from Venice via Ancona to Brindisi, thus connecting with the Brindisi-Athens-Constantinople service. The new line, Venice-Ancona-Brindisi, will be flown in 6½ hrs. including a stop of 1 hr. at Ancona.

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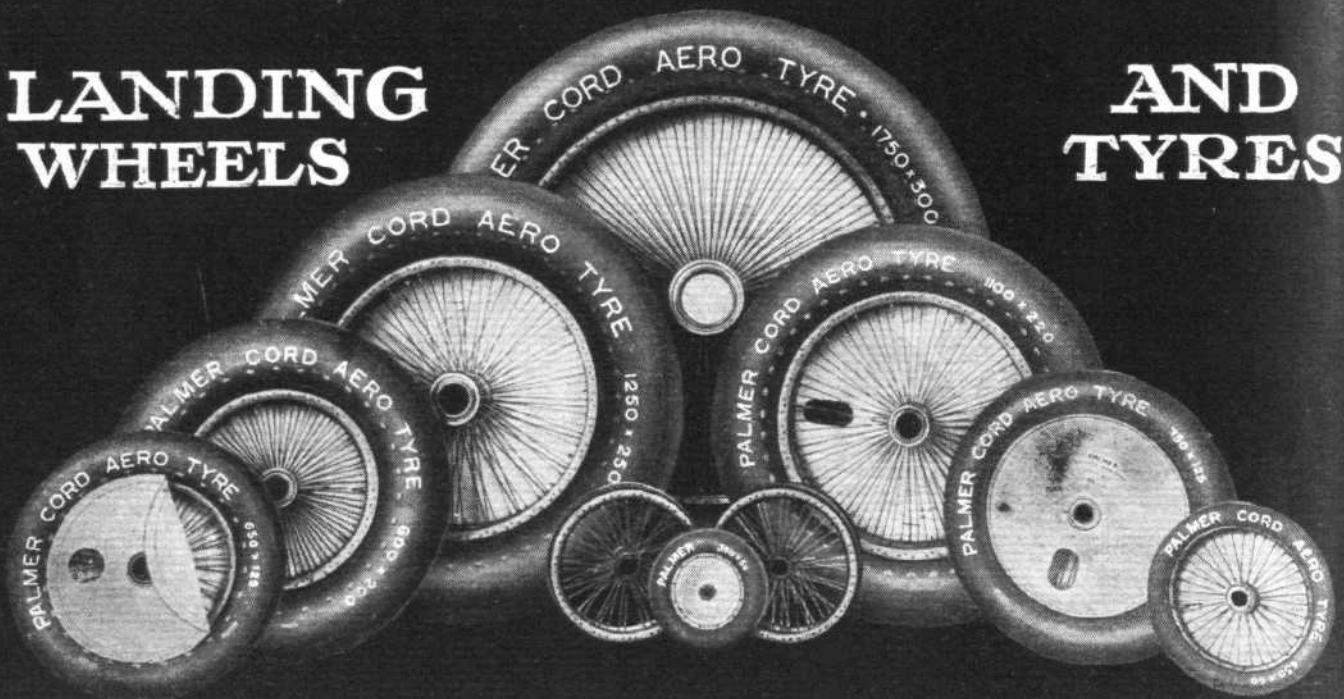


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		Length	Bore				Length	Bore				Length	Bore	
575 x 55	168	111'12"	25'4"	Central	700 x 100	176	178'	44'45"	Central	1000 x 180	148	220'	80'	Central
"	195	130'	38'09"	Central	"	179	178'	55'	132/46	"	149	185'	55'	Central
300 x 60	16	111'12"	25'4"	Central	650 x 125	119	178'	55'	132/46	"	155	220'	66'67"	Central
450 x 60	50	88'	31'75"	Central	"	147	178'	55'	Central	900 x 200	107	185'	55'	Central
"	172	130'	38'09"	Central	"	188	120'	34'92"	Central	"	108	185'	55'	125/60
575 x 60	21	160'	28'	Central	"	336	178'	44'45"	132/46	"	128	220'	66'67"	Central
"	180	150'	38'09"	104/46	750 x 125	77	178'	44'45"	132/46	"	137	250'	80'	Central
"	186	120'	34'92"	Central	"	92	185'	55'	135/50	"	157	185'	80'	Central
"	190	150'	38'09"	Central	"	95	185'	55'	Central	"	202	185'	60'32"	Central
600 x 75	21	160'	28'	Central	"	99	178'	38'89"	132/46	1100 x 220	134	220'	66'67"	Central
"	180	150'	38'09"	104/46	"	112	150'	38'09"	Central	"	136	250'	80'	Central
"	186	120'	34'92"	Central	"	176	178'	44'45"	Central	975 x 225	192	185'	60'32"	Central
"	190	150'	38'09"	Central	"	179	178'	55'	132/46	"	194	185'	55'	125/60
700 x 75	78	178'	44'45"	132/46	800 x 150	161*	185'	55'	135/50	1250 x 250	314	250'	80'	Central
"	79	178'	44'45"	Central	"	162*	185'	55'	Central	"	154	304'8"	101'6"	Central
"	100	178'	38'09"	132/46	"	163*	185'	66'67"	135/50	"	"	"	"	"
"	101	178'	31'75"	132/46	"	169†	185'	55'	135/50	1500 x 300	305	304'8"	152'4"	Central
"	196	178'	55'	Central	"	177	185'	55'	135/50	"	306	304'8"	101'6"	Central
600 x 100	188	120'	34'92"	Central	"	183	185'	55'	Central	1525 x 325	197	304'8"	101'6"	Central
"	304	150'	38'09"	104/46	"	211*	185'	60'32"	135/50	1750 x 300	139	400'	152'4"	Central
"	333	120'	34'92"	Central	1000 x 150	167	185'	55'	125/60	"	191	350'	150'3"	Central
700 x 100	77	178'	44'45"	132/46	"	174	250'	80'	Central	1750 x 350	193	400'	125'	Central
"	92	185'	55'	135/50	"	182	185'	55'	Central					
"	95	185'	55'	Central	"	187	220'	66'67"	Central					
"	99	178'	38'89"	132/46	"	201	185'	60'32"	125/60					
"	112	150'	38'09"	Central	"	210	185'	60'32"	Central					

*Wheels Nos. 161, 162, 163, and 211 are of stronger type than the other wheels for 800 x 150 tyres.
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†Wheel No. 169 is fitted with Ball Bearings (L/NB)

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The aircraft are Junkers F.13 and G.24 types, chosen as a result of the satisfactory experience with these types on the Vienna-Venice-Rome line. This latter route over the Alps is an exceptionally difficult one and the Transadriatica Company are to be congratulated on the results achieved, particularly during the past winter with its exceptionally severe weather. During the period December 1 to March 20 last, the Transadriatica Company's Junkers' machines on the Alpine route covered 127,650 kms., with 526 passengers and 11 tons of mail and freight, the traffic being nearly double that of the same period in the previous year. The service was run to schedule without accident.

Short "Calcutta" in America

MR. OSWALD SHORT is at present in the United States, and news has just been received that he has arranged for the American rights to construct the Short "Calcutta" flying-boat to be granted to the Keystone Aircraft Corporation of Bristol, Pennsylvania.

Canadian Air Mail Items

AN Order-in-Council has been issued at Ottawa establishing an air mail service branch of the Post Office department, under a superintendent, whose function it will be to consolidate previously established services and to supervise developments now in contemplation. The projected Canadian air mail developments for this year include several items that promise well for the future of air mail services in Canada. A route between Toronto and Buffalo, N.Y., to connect with the United States air mail services at the latter point, is under consideration. This service will provide Toronto and other centres in Ontario with fast communication with the air mail routes in the United States, effecting substantial gains in time. Air mail services between Toronto and Windsor, and between Winnipeg and Calgary and Edmonton are proposed. The routes between Winnipeg and Calgary and Winnipeg and Edmonton were thoroughly tried out last December and proved to be quite practicable. It is expected that the Toronto-Buffalo service and the Toronto-Windsor service will be in operation shortly. By early summer, the prairie services should be ready to start. The establishment of an air mail and later a passenger service between Vancouver and Calgary may result from a survey between the two cities being undertaken by Western Canada Airways, Ltd.

Berlin-London Services

By an arrangement concluded between the Deutsche Lufthansa and the Royal Dutch Air Lines an extra daily air service will be opened between Berlin and London on May 15 with three-engine Fokkers. An aeroplane will leave Berlin at 2 p.m. and arrive in Rotterdam at 6.29, and in London at 9. In the reverse direction the service will connect up with the night Harwich-Hook boat, the aeroplane leaving Rotterdam at 9.30 and arriving in Berlin at 12.55.

Air "Tramp" Arrives

CONSIDERED to be one of the first of its kind, the air "tramp" arrived at Croydon Aerodrome on May 1, after flying through the night across Europe from Berlin, picking up freight and mails at various points in Germany. The aeroplane will in future leave Berlin at 2 o'clock every morning and call at Hanover, Essen, Dusseldorf and Cologne, picking up mails and freight for London, where she is scheduled to arrive at 10.15. Mails posted in Germany up to a late hour each night will thus be delivered in London by noon the following day.

Bristol Aircraft in Mexican Wars

THE Bristol Aeroplane Co., Ltd. inform us that since the outbreak of civil war in Mexico, "Bristol" aeroplanes, supplied some time ago to the Mexican Air Force by them, have taken an active part in the Government campaign. The machines are of the Bristol "Boarhound" and Bristol "Fighter" types. General Calles, Minister for War and former President of Mexico, has telegraphed to the Bristol representative in Mexico stating "Bristol aeroplanes are giving magnificent service." Using one of the Bristol "Boarhound" machines, Colonel Sidar, of the Mexican Air Force, created a sensation by the capture, single-handed, of more than 2,000 rebels. Colonel Sidar located this large body of rebel troops and, flying low, dropped messages inviting their surrender. As a volley of rifle fire was the only response, Colonel Sidar dropped two or three bombs into their midst as a slight inducement to submit to reason, and also swept their ranks with machine-gun fire. A second appeal to surrender was unavailing, so the Colonel again treated his adversaries to a dose of bombs. The second application proved effective and the airman had the satisfaction of conducting more than two thousand prisoners to his own lines.

ARMSTRONG-SIDDELEY AERO ENGINES AT SWISS AERO SHOW

THE growing popularity of British aero engines on the Continent is indicated by the number of important airlines that are fitted with British equipment. The more progressive British manufacturer is also alive to the opportunities for expanding his European business in the air by participating in the principal aero shows on the Continent. Thus Armstrong Siddeley Motors, Ltd., were fully represented at the Swiss Aero Show, which took place at Geneva (from April 27 to May 5). The time was well chosen and as Geneva is an excellent centre, the event assumed a really international appearance.

The Armstrong Siddeley engines were exhibited on Stand No. 37 and comprised the 460-h.p., 14-cylinder "Jaguar," the 225-h.p., 7-cylinder "Lynx," the 130-140-h.p., 5-cylinder "Mongoose," and the 80-88-h.p., 5-cylinder "Genet." All these engines are of the air-cooled radial type, an interesting point being that the cylinders, pistons and many other parts of the three larger engines are identical, the difference in power being obtained by varying the number of cylinders used. This is an important point, because it means that it is possible for any organisation requiring full and varied equipment for a number of different purposes to specialise in Armstrong Siddeley engines and thus economise in the number of spare parts carried and the experience required for maintaining these engines. Thus fighter aircraft might be engaged by "Jaguars," and training aircraft by "Lynx" or "Mongoose."

The range is completed by the 80-88-h.p. "Genet," which is specially designed for light aircraft, and by the "Leopard," a 14-cylinder engine of 700-750-h.p., which has been specially developed for carrying very heavy loads such as torpedoes or troops. This engine was not shown at the exhibition, but, like other Armstrong Siddeley productions, is well-known on the Continent where it has already been in service in Heinkel seaplanes. The "Jaguar" engine, which can also be supplied with reduction gearing or with a supercharger, is a thoroughly proved production which has created a wonderful

record in the "Argosies" of Imperial Airways, by setting up a standard of 400 hours between overhauls, and entirely dispensing with the usual top overhauls. The "Lynx" engines are used on two of the most important Swiss airlines, on a new French airline, on the Dutch East India postal service and in the fighting forces of a number of foreign governments. The "Mongoose," which is a lower powered edition of the "Lynx," is coming into general use for British training aircraft, while the "Genet" is attracting widespread interest on the Continent owing to the fact that it recently won the East Prussian Flying Competition on a BFW-M aeroplane, and was also used on the Fecher machine which set up a world speed class record in Germany.

Technically, Armstrong Siddeley engines possess many interesting features, among which may be noted the patented method of securing the aluminium cylinder head to the steel cylinder barrel which provides a perfect gas-tight joint with good thermal contact, the extraordinarily simple, efficient and patented means adopted for holding the cylinders in the crankcase, the special system of assisting the distribution of gas by means of a fan and, of course, the epicyclic reduction gearing and the supercharging equipment. The reduction gearing provides the smoothest possible running and allows the engine to develop more power because it can be run faster. The propeller runs slower and so develops greater efficiency. This type of gearing is available with the "Jaguar" and "Lynx," and is being used on the new "Jaguars," which are operating on the London-India airline. The supercharging equipment has been in service in the British Royal Air Force for several years and is recommended for engines required to give the best results at very high altitudes.

It will be seen, therefore, that the range of Armstrong Siddeley engines covers every field of flying and that by using these engines either singly, in pairs, or in triplicate, every possible type of aeroplane, for land or sea service, can be powered by Armstrong Siddeley.

A SUGGESTED SAFE AND QUICK ARCTIC AIR ROUTE

DR. VILHJALMUR STEFANSSON, the Arctic explorer, who, having spent eleven winters in the Arctic, is again upon a visit to England, was able once more, through the good offices of Mr. Griffith Brewer, to meet the other day a few of his friends for a third re-union lunch, at Jules Restaurant. The occasion, as upon previous re-unions, was one of Mr. Brewer's delightfully informal gatherings in which intimate details of Dr. Stefansson's work and views were given by him, and queries raised by the privileged guests answered. As a suggestion for Dr. Stefansson to handle, Mr. Brewer put a hypothetical problem to him of a forced landing on the ice from the air of a party 100 miles from shore, and how would he get them out of their position?

Dr. Stefansson, in a happy vein, said no difficulty arose provided an adventurer was provided with a gun and a hundred cartridges, as it was quite easy to live in the Arctic regions and get back to the shore, even if it should take a couple of years. Dr. Stefansson also explained that contrary to the statements of various folk that it was not possible to land an aeroplane on the pack ice, it was not only possible but it had been proved by other aviators that it was comparatively easy to land an aeroplane fitted with skids practically anywhere, he giving definite examples of it having been done in ordinary Arctic routine work. He advocated, as against flying the Atlantic, from Newfoundland, a commercial air route from Chicago to London *via* Ontario, from there to a Labrador seaport, followed by a 500-mile

jump to Greenland, then across Greenland, with a further 200 miles to Iceland, 300 miles to Faroe Islands, and a last lap of 300 miles to Scotland. In this line of travel less fog, sleet and storm were encountered than on the Newfoundland route, and the distance was only about 200 to 300 miles more. To Stockholm, moreover, this route would be the shortest, and if to Moscow it was a bee line. Bases for supplies every 500 miles were easily fixed, and these could then be served regularly by steamer. In the Arctic there were many islands which could be made bases for refuelling. Should the objective be Pekin from New York then, subject to a detour of about 100 miles, practically the entire flight would be over land, reducing the time for mails from 28 days more or less to four days. Later, with improved and suitable machines a passenger traffic would soon be available in addition to the mails.

Commander Bower was of opinion that Sir Hubert Wilkins' suggested Arctic exploration by means of submarines was quite feasible, and did not embody any serious difficulties.

Air Vice-Marshal Sir Vyell Vyvyan said the possibility of air routes across the Arctic Circle was a practical proposition, and that their inauguration could not be ignored, he being, from experience of modern air transport machines, quite satisfied that 10 hours at a time could be travelled in complete comfort by passengers.

Time put an end to this all-too-short third re-union, Host Griffith Brewer earning the thanks of his guests—all air pioneers in various branches.



"MISS ETHYL" IS INSTALLED AT CROYDON AERODROME

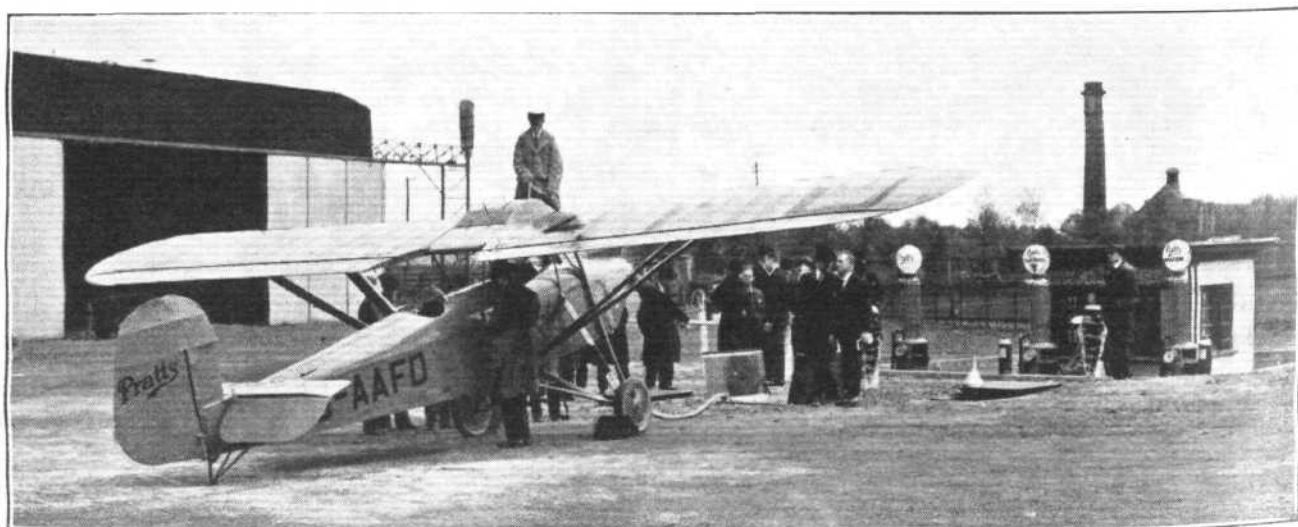
AS a sign of the times is the inauguration last week of a new Pratt's fuel supply station by the Anglo-American Oil Co., Ltd., at Croydon Aerodrome, just adjacent to the old "A.D.C." sheds. In addition to the installation of the fuel depot the occasion was also marked by the christening of a Westland "Widgeon" monoplane fitted with H.P. slotted wings, which the A.A. Co. have put into regular use for their representatives to fly wherever it may be necessary, whether in England or the Continent, in connection with the distribution of Pratt's fuel. The formal "christening" was performed by Air Vice-Marshal Sir Vyell Vyvyan, a director of Imperial Airways. "Miss Ethyl" is the appropriate name which this red-coloured machine bears upon its nose, so that none may mistake its origin.

At a subsequent luncheon at the Aerodrome Hotel, Mr. Francis E. Powell, the Chairman of the Anglo-American Oil Co., who presided, mentioned how much further air mail progress had developed in the United States as compared with Britain. There it had resolved itself into an economic proposition, letters being carried in a minimum of time 1,000 miles across the country for 5 cents. Every aviation company, and there were a very great number of them, was instal-

ling its own aerodrome, and thus helping to spread the facilities for general flying.

Sir Vyell Vyvyan, in responding for the Visitors, said that aviation might be regarded so far as petrol supply was concerned, as now being about in the same position as automobilism in its early days. Our Post Office was undoubtedly not so alive as in the United States in running air mails. We were badly backwards in that respect, and the commercial community was not going to sit down much longer under mails taking so long to get through, when the air offered such speedy despatch. It would be a big task for them now to catch up with what was being done in the United States and in Germany, although possibly in the latter case they had gone so far that possibly they had overdone it. The enterprise of the Anglo-American Oil Company, he was glad to say, was going to help enormously in seeing that aviators were able to get what they wanted, where they wanted it.

Mr. Powell, in calling upon Mr. Handley Page, said that in the United States practically every township had its own aerodrome—and he referred to the great impetus which Col. Lindbergh's work had given to flying over there. The Anglo-

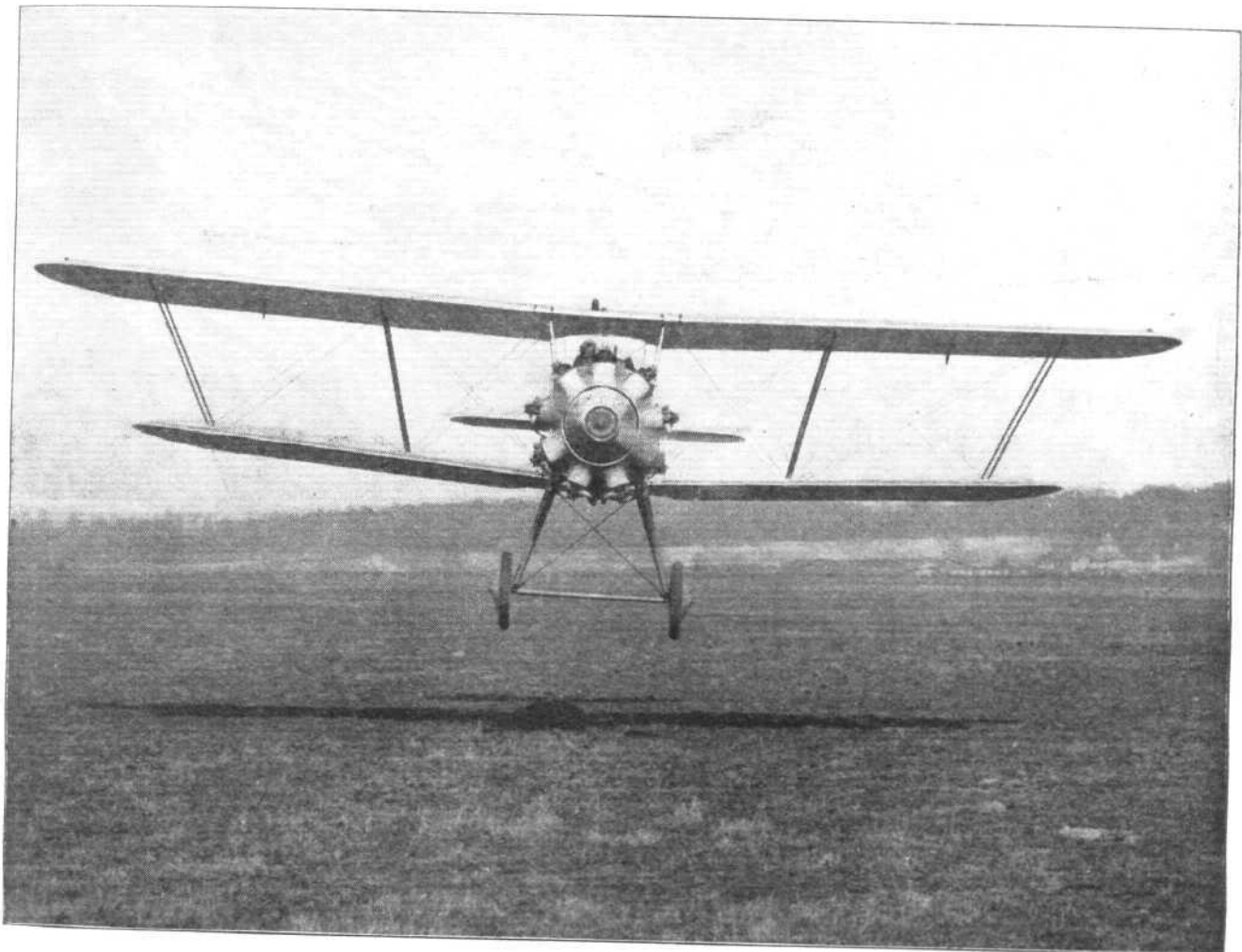


["FLIGHT" Photograph]

Christening of the Westland "Widgeon" (Gipsy), belonging to the Anglo-American Oil Co., Ltd., at Croydon Aerodrome. Its name, appropriately enough, is "Miss Ethyl."

THE HAWKER HAWFINCH

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[“FLIGHT” Photograph]

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American Oil Co. were endeavouring here to meet the pilots upon their own grounds and therefore had acquired their own machine, whereby they were able to visit the various aerodromes and so get into touch with the individuals, which was so much appreciated and spelt *personality*.

Mr. Handley Page referred to the dark days of aviation when it started 20 years ago, when no aerodrome existed in this country. It was amazing, he said, that now in that short time we had a company setting up a petrol station on an aerodrome upon a purely commercial basis, which meant that we had got to that stage when pilots must have petrol service and all other necessary things, as one could as a motorist. Before then it was a matter of adventure if one was able to get one's requirements filled. In conclusion he

referred briefly to the new up-to-date in all respects four-engined Handley Page machines, now building for Imperial Airways, which he thought would be a help to that company and to aviation, and following the installation that day he hoped the Anglo-American Oil Co. would open similar petrol stations all over the world.

Incidentally the visitors were presented with a little memento of the occasion, and a delightful illustrated booklet by E. Beresford Chancellor, dealing with "Fawkeshall," otherwise the ancient "Vauxhall and its memories, with a short account of the area around its famous Gardens comprising the site of the Anglo-American Oil Company's new installation." As an historical résumé of the one-time glorious Vauxhall Gardens it is quite a unique publication.

EDDIES

AN optimistic peep into the future of air transport has been opened up by Col. Lindbergh, when he very emphatically states that fog and smoke in the near future will have lost all its terrors to flyers. These "night mares" will be overcome, he claims, by the use of intersecting radio beams and special altimeters, rendering air travelling as regular and accurate as land travel. Further he states as a fact that there are a thousand American men and women training to fly, and that there is more private flying there than in the rest of the world combined. Not far in the distant future he foresees a great air line of multi-motored ships being maintained between New York, Washington, Buenos Aires and Rio de Janeiro. May Lindbergh be right in all his prophecies, as British efforts will certainly not be lagging far behind in that case.

—as one can well believe, the victims, who are good "spouters," will have *something* to say during the process.

APPARENTLY Air passengers had, after all, only a short respite from small-pox restrictions when entering France, as later orders were issued to impose the same examination, &c., upon all landing at the Villacoublay Aerodrome.

MOST of FLIGHT readers are probably motor-owners, drivers or "patrons" of motoring, and should therefore be interested in the latest production issuing from Fanum House, otherwise the home of the Automobile Association—to wit, a wonderful "Throughway" map of London, showing land-marks, upon a scale of $1\frac{1}{2}$ in. to the mile, and of the



"Aero Idioms"

ONE thing to be regretted is that probably, by the use to which one of the Norwegian whale-hunting companies has decided to put aeroplanes, viz., to locate the "schools" more readily, this leviathan of the oceans will the more speedily become extinct.

THE pilots named for this Antarctic adventure are Captain Larsen and M. Luetzow Holms, who are to leave in August for Bouvet Island, thence by the steamer *Norvegia* to their destination. By way of added interest it is intended to also take a film of the complete process of whale catching. That side of the venture should be a profitable one, especially if it is a whale "talkie" picture

Home Counties upon 1 in. to the four miles. It is without exception the clearest, the best, and most helpful map of the sort I have seen, and is obtainable in "indestructible" fabric by A.A. members at the modest price of 3s. 6d. It's worth while becoming a member to obtain it.

COSMOPOLITAN is the word that fits the activities of the A.A., which body has now extended its interests, by way of a start, to certain helpful work to push forward popular flying, so that their map has therefore a double appeal to FLIGHT readers, who will appreciate the good to the cultivation of flying-feeling which such a body as the A.A. can help to engender. Maj. Stenson Cooke seldom lets a chance slip by.

AEOLUS.

CORRESPONDENCE

[The Editor does not hold himself responsible for opinions expressed by correspondents. The names and addresses of the writers, not necessarily for publication, must in all cases accompany letters intended for insertion in these columns.]

THE FIRST SPIN

[2189] In your issue of March 7, on page 183, at the top of the second column appears the following: "It was on this latter machine that Lieut. Parke had the terrifying experience of getting out of a 'spin.' At the time the spin was not understood and the particular experience was referred to as 'Parke's dive.' We now know that it must have been a spin, and Parke found out purely by luck that by putting the 'stick' central and forward, the spin could be stopped."

In reference to the above, I have heard the following story about Professor Lindeman of Oxford, of which University I am an undergraduate. The story is that at a time when crashes resulting from spins were rather frequent (I've forgotten the year), he worked it out that one should put the stick forward whereas it had been found that most of the crashed machines had the stick back. He then took his bowler hat, with which he always flew, and went up to 4,000 ft., got into a spin, put the stick forward, and came out of the spin. To see if it was mere chance, he repeated the performance with the same result.

Without in the least wishing to contradict your statement about Lieut. Parke, I wondered if there was anything in the story of Prof. Lindeman, and thought that you would be my best informant. With apologies for trespassing on your time,

JOHN GOODDEN

Sherborne, Dorset.

March 29, 1929.

GAME HUNTING FROM THE AIR

[2190] There appeared in your issue of April 11, an account of the slaughter of two gazelles from an aeroplane, by the

Vicomte de Sibour, in the desert beyond Baghdad. It was probably a thoughtless act on the part of the Vicomte, but it seems incredible that such acts are committed, and it is high time that official action is taken to prevent the recurrence of such an unsportsmanlike proceeding.

In order to avoid unnecessary suffering on the part of his quarry, a big game hunter will go to infinite trouble to place himself in such a position as will afford him the best opportunity of an immediate kill, and in the rare event of a wounded animal escaping, he will follow it up until he has finally dispatched it.

As it is impossible to shoot with a rifle from the air with any real degree of accuracy, it follows that if aeroplanes are to be used for shooting purposes, large numbers of animals will be wounded, and left to die in agony.

T. CAMPBELL BLACK

Brighton.

April 12, 1929.

DETAIL STRESSING

[2191] With reference to Mr. Roger's remarks on the table published under "Detail Stressing" in the *Aircraft Engineer* of January 31, the suggestion of an additional column, showing basic loads calculated on the core area, is one that would undoubtedly improve the usefulness of the table.

Loads calculated on full areas naturally have their own particular uses and could not conveniently be omitted.

The use of stress intensity symbols under column headings is obviously a misquotation.

Southampton,

March 29, 1929.

H. PARKINSON

Death of Sir G. Butler, M.P.

WE regret to have to record the death of Sir Geoffrey Butler, M.P. for Cambridge University, and Parliamentary Private Secretary to Sir Samuel Hoare. He died in a London nursing home on May 2. Sir Geoffrey Butler founded the Cambridge University Air Squadron.

India Air Route Free

AIR VICE-MARSHAL SIR SEFTON BRANCKER, Director of Civil Aviation, arrived at Croydon Aerodrome on May 7 on his return from Athens, where he has concluded negotiations for the permanent operation of the Imperial Airways London-India Air Mail route across Greek territory.

Reliability Test of "Gipsy" Engine

THE De Havilland Aircraft Co. Ltd., inform us that the reliability test of a sealed De Havilland "Gipsy" engine is still in progress. The engine, which is standard and fitted in a standard "Moth," has now done 360 hours with only routine attention. About 32,000 miles have been flown at a cruising speed of 88 m.p.h. This test has been going on every day at Stag Lane Aerodrome in all weathers, and a variety of pilots, including apprentices who have their tickets, have shared the flying duty. Consumption of petrol and oil has been normal, we understand.

Simmonds Aircraft Appointment

MR. W. D. ROBERTS, Member of the Institution of Civil Engineers, and late Inspector-General of the Egyptian Ministry of Public Works, has been elected a director of Simmonds Aircraft, Ltd. In addition, Mr. Roberts will be manager of the Southampton works.

Northern Air Lines, Ltd.

SOME further details of the plans of Northern Air Lines, Ltd., are as follows. They are a "private company," and believing that internal air services, such as taxi work, instruction, pleasure flights, etc., offer a fair chance of profit, they are not making any public issue, nor asking any assistance from the taxpayer.

It is proposed to establish a school, and to do instructional work, a number of prospective pupils having already appeared. A system for "hiring-out" Avians to approved pilots for week-end trips is to be organised, and an active sales campaign arranged with special "service after sales" facilities. To commence this work they have purchased two new Genet-Avians from A. V. Roe & Co., and expect to

add to these very shortly. Delivery of the Avians has been obtained and they have a D.H. Moth already.

For air taxi work they will use D.H.9 cabin machines. Another two are being completed in their Shrewsbury works. They are negotiating with A. V. Roe & Co. for a Fokker Five and a Fokker Ten, and may increase their fleet with more of that type. Avians are being used for single passenger work, and for joy-riding. Avro 504K's. The last two branches of their work are in full swing and running successfully.

Aviation Badges

AERO HIRE, LTD., have produced a badge for aviation enthusiasts. Single badges or brooches are priced at 2s. each, post free, cash with order. They hope that everyone will wear one in order to spread the gospel of aviation. The address of the company, of which Mr. V. N. Dickinson and Mr. L. W. Van Oppen, both members of the R.A.F.O., are directors, is Clarence Chambers, 39, Corporation Street, Birmingham, England.

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Aviation Literature

MESSRS. SIMPKIN, MARSHALL, LTD., have been appointed sole distributors in this country of the Ronald Press Co. of New York *Aeronautic Series*. Among the titles are: "Practical Flying: a Training Manual for Airplane Pilots," by Byron Q. Jones; "Aeronautical Meteorology," by Willis Ray Gregg; "Aerial Photographs," by Lieut. Dache M. Reeves. The publishers will forward an illustrated list upon application.

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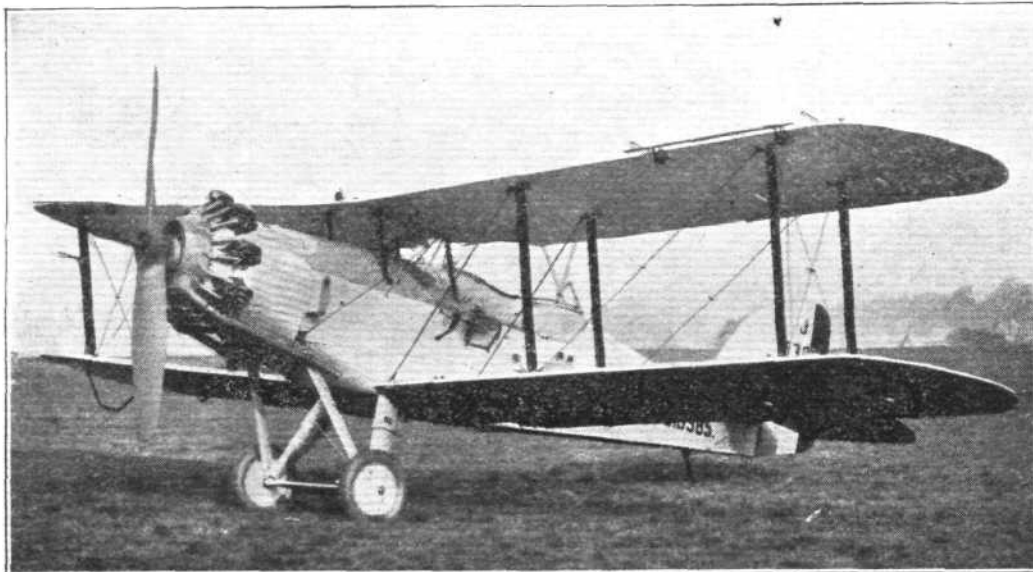
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*Air Ministry Report
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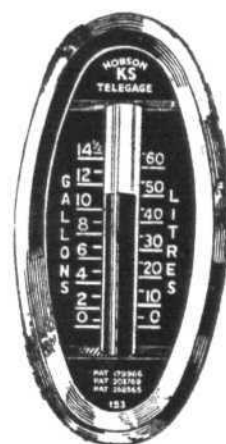
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THE ROYAL AIR FORCE

London Gazette, May 3, 1929.

General Duties Branch

The following Flying Officers are granted permanent commns. in this rank (May 1):—H. B. Barrett, R. G. Hart, M.C., C. W. L. Trusk, A.F.C. Flight-Lieut. W. Elliot, D.F.C., is granted the acting rank of Sqdn.-Leader whilst employed as British Liaison Officer, Beirut (March 29). Flight-Lieut. L. Smith takes rank and precedence as if his appointment as Flight-Lieut. bore date June 30, 1922, immediately following Flight-Lieut. F. N. Trinder on the graduation list. Reduction takes effect from Jan. 28, 1929.

The follg. Flight Lieuts. are transferred to Reserve, Class A:—J. G. Murray (April 28); R. S. Barbour (May 1). The short-service commn. of Pilot Officer on probation E. F. Wheeler is terminated on cessation of duty (May 1). Lieut. H. S. Cooper, R.N., Flying Officer, R.A.F., relinquishes his temporary commn. on resigning his commission in the R.N. (April 22). Lieut. A. G. Warren, R.M., Flying Officer, R.A.F., relinquishes his temporary commn. on return to duty with the Royal Marines (April 27).

The follg. cease to be attached to R.A.F. on return to Naval duty:—Lieut.-Comdr. E. M. C. Abel-Smith, R.N., Flight-Lieut. R.A.F. (March 18); Lieut. G. R. M. Robertson, R.N., Flying Officer, R.A.F. (March 27).

ROYAL AIR FORCE INTELLIGENCE

Appointments.—The following appointments in the R.A.F. are notified:

General Duties Branch

Wing Commander J. McCrae, M.B.E., to H.Q., Air Defence of Gt. Britain, for Personal Staff Duties, 23.4.29.

Squadron Leaders: C. R. Carr, D.F.C., A.F.C., to No. 4 Flying Training Sch., Middle East, 27.4.29. R. S. Sugden, A.F.C., to H.Q., Air Defence of Gt. Britain, 24.4.29. F. Fowler, D.S.C., A.F.C., to R.A.F. Depot, Uxbridge, 8.2.29. C. St. Noble, to Central Flying Sch., Wittering, 18.4.29. S. T. Freeman, M.B.E., to R.A.F. Base, Kai Tak, China, 8.2.29.

Flight-Lieutenants: H. H. Down, A.F.C., to No. 448 (S.R.) Flight, Mediterranean, 16.4.29. D. H. Carey to Armoured Car Wing, Iraq, 18.3.29. A. L. Paxton, D.F.C., to No. 1 Flying Training School, Netheravon, 1.5.29. W. A. B. Savile, to No. 5 Flying Training Sch., Sealand, 1.5.29. O. R. Gavford D.S.C., to Station H.Q., Heliopolis, Middle East, 18.4.29. R. N. Waite, to No. 47 Sqdn., Middle East, 18.4.29. G. N. Carroll, to No. 58 Sqdn., Worthy Down, 23.4.29. E. H. Searle, to No. 13 Sqdn., Andover, 22.4.29.

Stores Branch

H. H. Hilliar is granted a permanent commn. as Pilot Officer on probation, with effect from and with seniority of Jan. 10; Flying Officer O. W. Tregarthen Rogers is placed on retired list on account of ill-health (April 28).

Accountant Branch

Flying Officer R. W. Freeman is placed on retired list at his own request (May 1); Flying Officer W. F. Barrell is transferred to Reserve, Class C (April 28).

RESERVE OF AIR FORCE OFFICERS

General Duties Branch

The follg. are granted commns. in Class AA (ii) as Pilot Officers on probation:—P. C. Hordern, E. A. M. Norie, H. R. A. Edwards (April 15); D. P. H. Esler (April 17); G. P. Jewett (April 19). Pilot Officer J. L. Muir is promoted to rank of Flying Officer (April 24). The follg. Pilot Officers on probation are confirmed in rank:—G. H. Thevenard (April 24); G. R. De Havilland (April 30). Pilot Officer H. D. Hinde is transferred from Class AA (ii) to Class C (Oct. 19, 1928) (substituted for *Gazette*, April 23, 1929); Pilot Officer T. Herbert is transferred from Class C to Class BB (April 11). Flying Officer R. G. R. Godby relinquishes his commn. on completion of service (March 29).

Pilot Officers: The following Pilot Officers are all posted to No. 3 Flying Training Sch., Grantham, for flying training, with effect from 27.4.29:—E. H. Bellairs, H. R. Black, E. L. Brackenbury, W. K. Brett, E. H. Coleman, E. E. Ellison, R. Ellison, G. Farnhill, G. D. Fleming, G. M. Gillan, S. R. Hall, K. D. Knecker, J. E. Loverseed, W. M. L. Macdonald, L. McHardy, G. L. S. Marsh, W. R. A. Matheson, P. R. May, E. J. K. Megaw, D. A. Messiter, V. B. Myers, L. F. H. Orr, M. E. M. Perkins, G. W. Phillips, M. V. Ridgeway, F. N. D. Scally, N. C. Singer, H. O. Singleton, R. Smith, R. Todd, M. Watson, F. Whittingham, D. H. G. Wood, A. E. Smith, and W. E. M. Slocock.

O. J. O'Hara, to R.A.F. Depot, Uxbridge, 5.4.29. G. F. Humphries, to No. 502 Sqdn., Aldergrove, 1.5.29.

Stores Branch

Flight-Lieutenant E. A. Tottle to Aircraft Depot, Iraq, 26.4.29. Flying Officers: B. Allen, to R.A.F. Record Office, Ruislip, 24.4.29. M. E. O. Atkinson, to Aircraft Depot, Iraq, 26.4.29.

AIR MINISTRY NOTICE TO AIRMEN

Night Flying without Navigation Lights

Pilots are warned that aircraft may be flying over the area bounded by Bishops Cleeve, Chatham, Cranbrook, Godalming, Farnborough and Windsor on any night from April 29, 1929, to August 11, 1929, inclusive, at and above an altitude of 4,000 ft. the aircraft will not exhibit navigation lights. Attention is drawn to the fact that the area in question includes Croydon aerodrome.

(No. 25 of 1929.)

Flights Across the Channel: Arrangements for Reporting and Search

1. A SIGNAL panel has been provided at Ostend (Steen) aerodrome for the acknowledgment of circuit signals made by aircraft not equipped with W/T and utilising the arrangements for signalling their passage across the English Channel, described in Notice to Airmen No. 38 of 1928.

2. The fact that a circuit made around Ostend (Steen) aerodrome, notifying arrival from or departure for England, has been observed by the ground personnel, will be indicated to the pilot of an aircraft by the display of a black-and-white chequered panel, 4 by 4 m. in size, in a position 20 m. from the aerodrome buildings.

3. The aircraft must continue to circle until the panel is displayed, as it is of the utmost importance that this signal of acknowledgment be received before the aircraft continues its flight. Otherwise, in the case of incoming traffic, the aircraft may subsequently be reported missing, and, in the case of outgoing traffic, no notification of the intended Channel crossing will be made to Lympe aerodrome—the aircraft, therefore, proceeding without the protective arrangements having been instituted.

(No. 26 of 1929.)

The Royal Air Force Memorial Fund

The Executive Committee of the fund met at Idlesleigh House, on May 1. Sir Charles McLeod, Bart., the newly appointed chairman in succession to Lord Hugh Cecil, was in the chair.

The usual financial statements were laid before the committee and the issue of grants made since the last meeting on March 13, 1929, amounting in all to £2,046 13s., were approved by the committee.

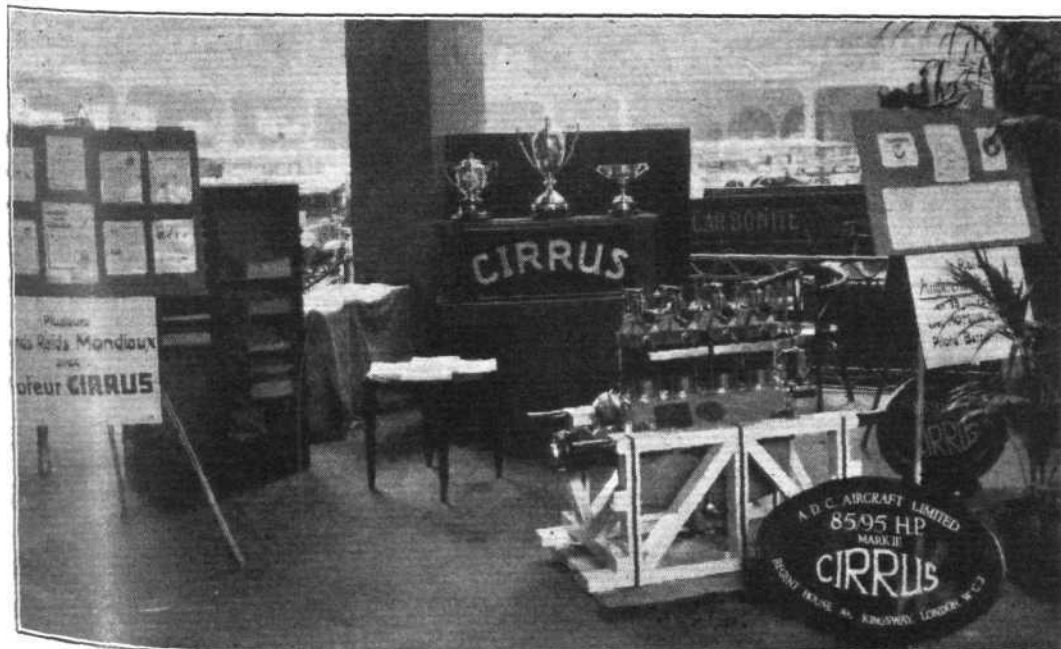
The chairman referred to the recent death of Lord Revelstoke, who was appointed a trustee of this fund at the end of 1928, and stated that he had forwarded on behalf of the committee a message of condolence and regret to the relatives of the deceased.

The committee considered the appointment of a fresh trustee and it is hoped a decision in this matter will be arrived at within the course of the next few weeks. Attention was drawn to the R.A.F. Display, which will take place at Hendon Aerodrome on Saturday July 13, next.

The committee considered the question of having a deputy-chairman appointed and this matter will be further considered at the next meeting, which will be held on Wednesday, June 26, 1929, at the offices of the fund at 3 o'clock.

At the usual meeting of the Grants Sub-Committee held on April 11, (present—Mr. W. S. Field, in the chair, and Mrs. L. M. K. Pratt-Barlow) 16 cases were considered and grants made to the amount of £423 13s. 5d.

At the next meeting, on April 25, Lieut.-Com. H. E. Perrin was in the chair, other members present being, Mrs. Pratt-Barlow, Mr. W. S. Field, and Sqdn.-Ldr. A. H. Wann. In all 15 cases were considered and grants made to the amount of £348 19s. 6d.



At the Geneva Aero Show: British engines were well represented at Geneva, and our illustration shows the stand of Cirrus Aero Engines, Ltd.

IN PARLIAMENT

Civil Aviation and Railway Stations Marking.

CAPTAIN BRASS, on April 29, asked the Secretary of State for Air whether he will consider approaching the railway companies for permission to inscribe the name of each station in large white letters on the roof or laid out in white stones in an adjacent field in order to assist amateur civilian pilots to find their way about the country.

Sir S. Hoare: A good many stations are marked in the way suggested, and such marking is useful to pilots who have lost their way. Pilots are encouraged however, to fly by compass rather than by ground signs, and I do not think I should be justified in pressing the railway companies to extend the system of marking.

Imperial Airways, Ltd., Subsidies

MR. VIANI, on May 1, asked the Secretary of State for Air what subsidies are to be paid to air transport services during the financial year 1929-30; to what particular services are they to be paid; and what amounts are to be paid to each service?

Sir S. Hoare: The maximum amount which can be earned in 1929-30 is £335,000, of which £125,000 is in respect of the European services and £100,000 and £110,000 in respect of the London-Egypt and Egypt-Karachi services, respectively, of Imperial Airways, Ltd. In addition, provision to the extent of £5,000 has been made for preliminary expenses in connection with the proposed air service to South Africa.

Mr. Viani asked what instalments have been paid to Imperial Airways, Limited, on account of subsidy in respect of Eastern services since September, 1926; on what dates were they paid; and what sums representing unearned subsidy were held by Imperial Airways, Ltd., on March 31, 1925, and on March 31 of the years 1926, 1927, 1928, and 1929 in respect of Eastern services and in respect of European services respectively?

Sir S. Hoare: The following tables give the information requested:—
IMPERIAL AIRWAYS, LTD.—Subsidies in respect of Eastern Services. Dates of payment and amounts:—1926: Dec. 31, £30,000; 1927: June 14, £30,000; Sept. 7, £25,000; 1928: Jan. 4, £30,000; Feb. 1, £4,400; May 5, £30,000; Aug. 25, £25,000; Dec. 30, £2,300. 1929: Jan. 1, £30,000; Feb. 1, £6,300; April 9, £25,200; April 11, £33,000.

Unearned subsidy held by Imperial Airways, Ltd., at various dates. European Services: nil. Eastern Services: March 31, 1927, £13,500; 1928, £5,700; 1929, £4,800. The outstanding balances are adjusted in all cases in the next account.

Mr. Viani asked what subsidies were paid to air-transport services during the financial year 1928-29; for what particular services were they paid; and what were the amounts actually earned on each service?

Sir S. Hoare: The amount actually earned was £230,000, of which £137,000 was in respect of the European and £93,000 in respect of the Eastern services of Imperial Airways, Ltd. The amount paid was the same but included adjustments at the beginning and end of the year.

Mr. Viani asked what is the approximate cost to the State on account of subsidy for each mile flown by Imperial Airways, Ltd., for the years 1926, 1927, and 1928 in respect of European services and Eastern services respectively?

Sir S. Hoare: The following table gives the information required:—
Year and cost per mile flown. European Services: 1926, 3s. 9d.; 1927, 4s. 5d.; 1928, 3s. 5d. Eastern Services: 1927, 17s. 4d.; 1928, 15s. 10d.

Mr. Viani asked what is the approximate cost to the State on account of subsidy for each ton-mile operated by Imperial Airways, Ltd., for the years 1926, 1927, and 1928 in respect of European services and Eastern services respectively?

Sir S. Hoare: The following table gives the information required:—
Year and cost of subsidy per ton-mile European Services: 1926, 5s. 7d.; 1927, 5s. 6d.; 1928, 3s. 10d. Eastern Services: 1927, £2 2s. 2d.; 1928, £1 4s. 5d.

Commercial Aeroplanes

SIR SAMUEL HOARE, on May 2, in reply to Colonel Woodcock, said the mileage flown on regular routes in 1928 by commercial aeroplanes was as follows: Germany, 6,750,000; France and French Colonies, etc., 4,500,000; British Empire, approximately, 1,750,000. The two former figures are estimates. The opening of the India route will add, this year, a very large number of miles to the British figures.

South Africa Air Services

SIR S. HOARE, in reply to Lord Erskine, said he was glad to be able to announce that the Government of Southern Rhodesia have just intimated their willingness to arrange for a contribution of £10,000 a year for a period of five years. In addition, as stated some weeks since, the Union Government have undertaken to provide a very substantial proportion of the requisite subsidy, whilst definite offers to contribute have also been received from the Administrations of the Sudan, Kenya, Tanganyika, and Uganda. The House would, he was sure, be gratified to know that, as a result of this ready co-operation on the part of the various Administrations mentioned, the finance of the service was now assured.

Air Services

SIR S. HOARE, in reply to Col. Woodcock, said the route mileage at present operated by British commercial air lines throughout the Empire, including the Dominions, is approximately 13,000. The corresponding figure in 1928 for France and French colonies was 12,500 miles, whilst the figure in the case of Germany was approximately 18,000 miles. I should add that, according to recent information, the German route mileage is likely to be reduced in the near future, whilst the British figure should, in due course, rise to nearly 24,000, when the England-South Africa route and certain additional services projected by the Australian Government are brought into operation.

Aerodromes in India

SIR HARRY BRITTAIN, on May 6, asked the Under-Secretary of State for India how many aerodromes there are in India suitable for landing and taking off by aeroplanes of the type which recently made a non-stop flight from England to Karachi; and where such aerodromes are situated?

Earl Winterton: The suitability of aerodromes for the purpose referred to depends on the fuel-load of the aeroplane at the time. For aeroplanes with moderate fuel-loads there are 91 such aerodromes in India, the names of which can be furnished if desired. I am, however, unable to state how many of these would be suitable for aircraft carrying such heavy fuel-loads as that carried by the aeroplane which recently made a non-stop flight from England to Karachi.

Indian Civil Aviation

MR. GARDNER asked the Under-Secretary of State for India whether any contract has yet been made by the Government for the operation of a subsidised air service from Karachi to Delhi; and whether the subsidy to the company operating this route will constitute the total subsidy by the Government of India to civil aviation in India?

Earl Winterton: The Government of India have called for tenders for the operation of a subsidised air service from Karachi with an eventual extension to Calcutta. The subsidy to the company operating this route will for the time being be the only subsidy paid to an aviation company by the Government of India; but they have also assisted the development of civil aviation, by grants to aeroplane clubs, by a scholarship scheme for the training of selected Indians in civil aviation, by substantial contributions to the cost of the Imperial airship scheme, and by the grant of free facilities for five years to Imperial Airways at the Karachi civil aerodrome, in connection with the operation of the London-Karachi air service.

Advertisement Correction.

In the full page advertisement of the Vacuum Oil Company's which appeared in last week's issue of FLIGHT, the De Havilland Aircraft Co., Ltd., was inadvertently linked with the Genet engine, and Armstrong Siddeley Motors, Ltd., with the Gipsy engine. The positions should, of course, have been reversed, which no doubt every reader did at once.

Change of Address

THE Far-East Aviation Co. of Hong Kong, inform us that their new address is Asiatic Building, 1st Floor, Queen's Road Central, Hong Kong.

Change of Name

ALL-WEATHER Motor Maps, Ltd., inform us that their name is now changed to Raynold Maps, Ltd. The address is the same, Lincoln House, High Holborn, W.C.2.

PUBLICATIONS RECEIVED

Aeronautical Research Committee Reports and Memoranda: No. 1025 (Ae. 366).—Full Scale Tests of Bristol Fighter Aeroplane with R.A.F. 30 Wings, Fitted with "Pilot Planes" at the Wing Tips. By W. G. Jennings, B.Sc. August, 1928. Price 4d. net. *No. 1170 (Ae. 334).*—Report of the Airworthiness of Semi-Rigid Airships Sub-Committee. November, 1928. Price 9d. net. *No. 1188 (Ae. 350).*—Full Scale Experiments with a Bristol Fighter Fitted with Slots and Flaps and Slot and Aileron Control. By K. V. Wright, B.A. June, 1928. Price 9d. net. H.M. Stationery Office, Kingsway, London, W.C.2.

The Journal of "The Royal Aeronautical Society," with which is incorporated "The Institution of Aeronautical Engineers." No. 220. Vol. XXXIII. April, 1929. The Royal Aeronautical Society, 7, Albemarle Street, London, W.1. Price 3s. 6d.

Fundamentals of Fluid Dynamics for Aircraft Designers. By Max M. Munk. The Ronald Press Co., 15, West 26th Street, New York. Price \$8.00.

Lanoline Rust Preventers.—Department of Scientific and Industrial Research. Engineering Research Special Report No. 12. H.M. Stationery Office, Kingsway, London, W.C.2. Price 1s. net.

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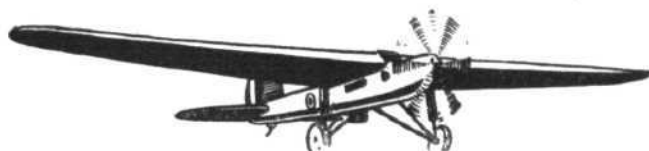


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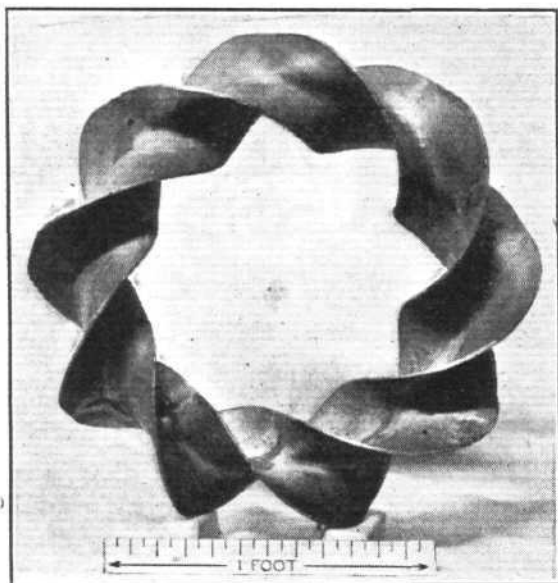
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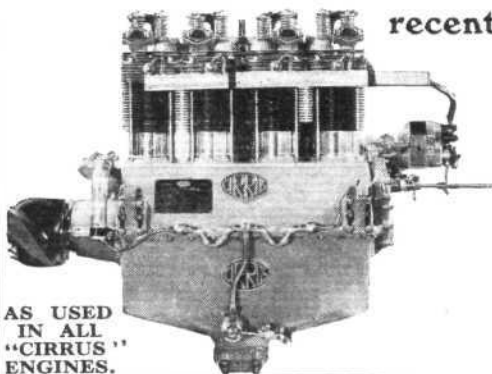
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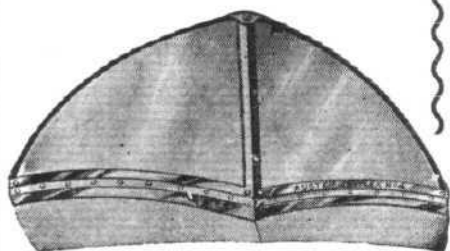
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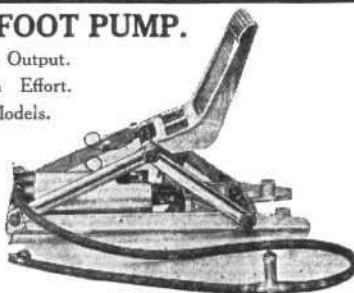
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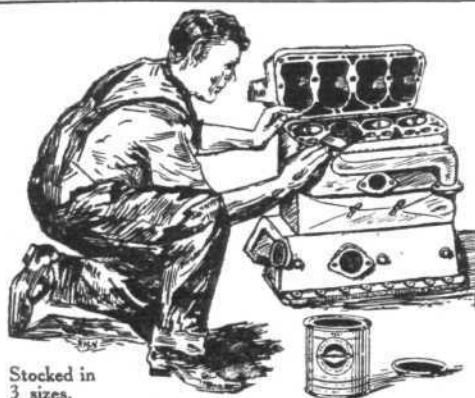
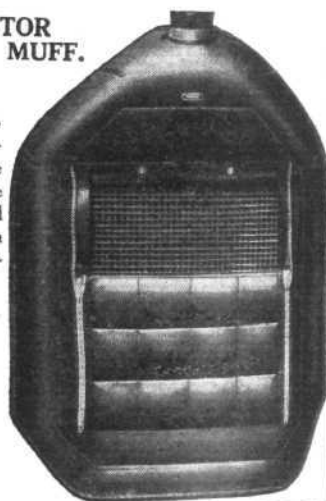
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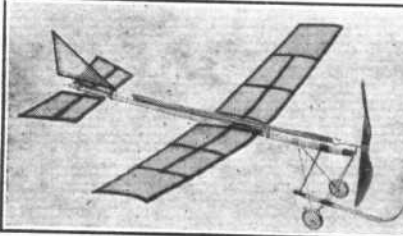
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